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Series XV. Number 4

UNIVERSITY OF ILLINOIS LIBRARY

BULLETIN

OF THE

University of Notre Dame

NOTRE DAME, INDIANA

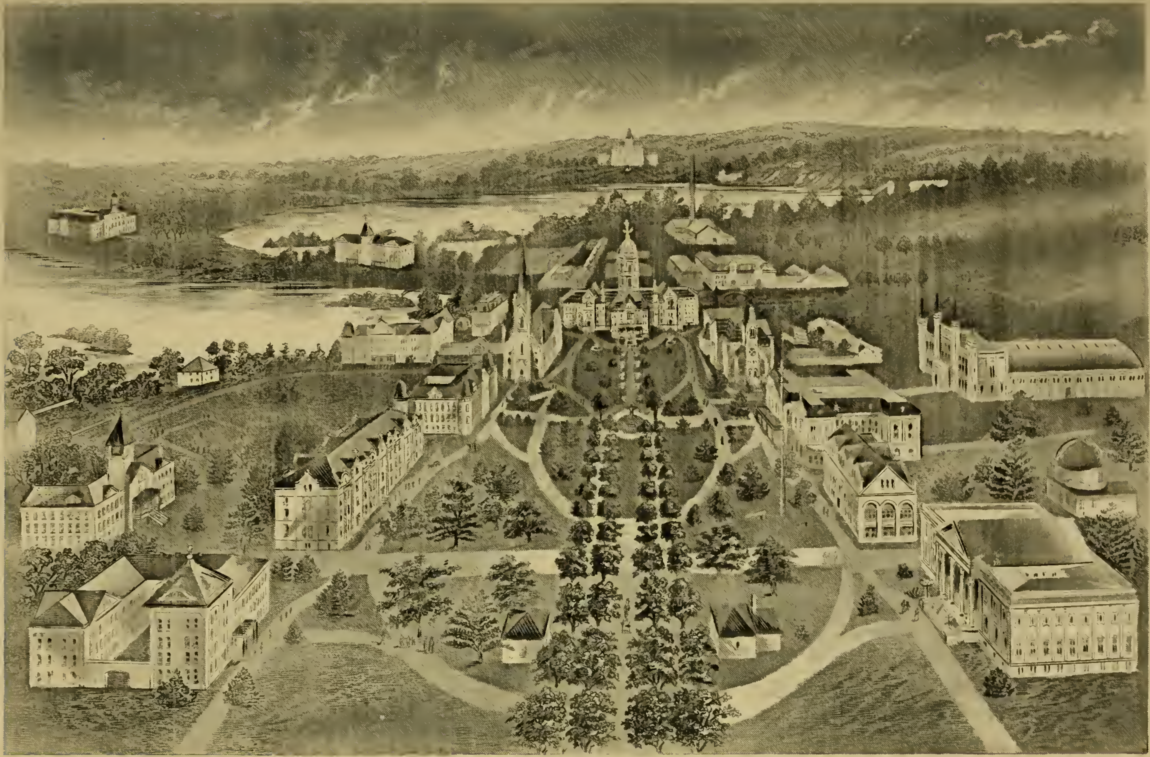
GENERAL CATALOGUE

1919-1920

PUBLISHED QUARTERLY BY THE UNIVERSITY

THE UNIVERSITY PRESS
APRIL, 1920

Entered as second-class matter at Notre Dame, Indiana. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918.



UNIVERSITY OF NOTRE DAME
Notre Dame, Indiana

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DIRECTORY OF THE UNIVERSITY

The FACULTY—Address:

THE UNIVERSITY OF NOTRE DAME,
Notre Dame, Indiana

The STUDENTS—Address:

As for the Faculty, except that the name of the hall in which the student lives should be added.

A post office, a telegraph office, a long distance telephone, and an express office are at the University.

The University is two miles from the city of South Bend, Indiana, and about eighty miles east of Chicago. The New York Central, the Grand Trunk, the Vandalia, the Indiana, Illinois & Iowa, the Chicago and Indiana Southern, and the Michigan Central Railways run directly into South Bend. A trolley line runs cars from South Bend to the University every fifteen minutes.

The Latitude of the University is 41 degrees, 43 minutes, and 12.7 seconds north, and 86 degrees, 14 minutes and 19.3 seconds west of Greenwich.

The elevation is about 750 feet above the sea.

From this it is clear that the location is favorable for a healthful climate where students may engage in vigorous mental work without too great fatigue or danger to health.

CALENDAR FOR 1920-1921

	1920	
September	13, 14, 15	Entrance Examinations and examinations of Conditioned Students who are to enter the Senior year. Registration.
September	16	Colleges open.
October	13	Founder's Day.
October	26	Annual Retreat begins in the evening.
November	1	Feast of All Saints.
November	22, 23, 24	Mid-term Examinations.
November	25	Thanksgiving Day.
December	6	The William P. Breen Medal Orations.
December	8	Feast of the Immaculate Conception.
December	20, 21	Written tests in all classes.
December	21	Christmas Vacation begins at noon.
	1921	
January	6	Classes resume at noon.
January	27, 28, 29	Term examinations.
January	31	Second term begins.
February	22	Washington's Birthday. Presentation of the Flag by the Senior Class.
March	17	St. Patrick's Day.
March	27	Easter. Easter Vacation — Noon March 23 to noon March 30.
April	7, 8, 9	Mid-term Examinations.
May	10	Latest date for handing in Prize Essays and graduating theses in all colleges.
May	30	Decoration Day.
June	2	The Patrick T. Barry Medal Contest.
June	4, 6, 7	Examinations of Candidates for Degrees.
June	7, 8, 9	Final Examinations in all the Colleges.
June	12	Baccalaureate Sermon. Blessing and Raising of the Senior Flag. Meeting of the Alumni.
June	13	Commencement. Bachelor's Orations 10:00 A. M. Commencement address and graduation exercises 8:00 P. M.

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UNIVERSITY OF NOTRE DAME

The University of Notre Dame was founded in the year 1842 by the Very Reverend Edward Sorin, C. S. C., the late superior general of the Congregation of Holy Cross. In an act approved January 15, 1844, the Legislature of Indiana gave the University power to grant degrees. The beginning of this act is:

"Be it enacted by the General Assembly of the State of Indiana, that Edward Frederick Sorin, Francis Lewis Cointet, Theophilus Jerome Marivault, Francis Gouesse, and their associates and successors in office be, and are hereby constituted and declared to be, a body, corporate and politic, by the name and style of the 'University of Notre Dame du Lac,' and by that name shall have perpetual succession, with full power and authority to confer and grant, or cause to be conferred and granted, such degrees and diplomas in the liberal arts and sciences, and in law and medicine as are usually conferred and granted in other universities in the United States, provided, however, that no degree shall be conferred and diplomas granted, except to students who have acquired the same proficiency in the liberal arts and sciences, and in law and medicine as is customary in other universities in the United States."

UNIVERSITY BUILDINGS

THE ADMINISTRATION BUILDING

The dimensions of this building are 320 by 155 feet; it is five stories, 207 feet in height, and is surmounted by a dome. The executive offices, two study-halls, some dormitories, and class rooms and dining-rooms are in this building. This building, like all the others of the University, is lighted by electricity and gas, and heated by steam. The corridors of the first floor are decorated with mural paintings by Gregori, representing the life of the Discoverer of America.

THE CHURCH

The Church of the Sacred Heart is 275 by 120 feet in ground dimension and 125 in height from the floor to the roof ridge. The interior is decorated by Gregori, and the architecture is Gothic. There is a large crypt and many chapels. In the tower is a chime of 32 bells and the great six-ton chief bell.

THE LIBRARY

The new Library of the University of Notre Dame, recently completed, is a building of 152 feet frontage and 108 feet in depth. In the planning of this library no efforts have been spared to apply all the latest and most approved ideas in library construction.

The main floor makes provision for two large reading rooms, each 108 feet by 32 feet—one on the south side for reference, the other on the north side for magazines, newspapers, and periodicals. In the reference room, provision is made for 12,000 volumes, and immediately adjoining this is a large room containing the bibliographical collection. Here also are to be found two sixty-drawer cabinets for subject-card bibliography.

When one enters the building, the first thing that meets the eye is a stately delivery hall, sixty feet by thirty feet situated midway between the two reading rooms and guarding the entrances to them. The catalogue room is conveniently located to the rear of the delivery desk, so that patrons who wish to use the loan department may do so without disturbing the students in the reading rooms engaged in serious reference work. This room contains 1080 drawers, with a capacity of over 1,000,000 cards. In the stacks alone the building can accommodate over 600,000 volumes. The University's collection is at present between 100,000 and 105,000 volumes.

Besides the general collection, there are several special libraries in this building. The Edward Lee Greene Library of Botany comprises 4,000 choice and rare volumes of botanical works, including many first editions and books now out of print. This library is for the use of advanced students in botany. The Green Herbarium, composed of about sixty thousand exquisitely mounted specimens of plants, is also kept here. Among these are many hundreds of specific types and some generic types, making it a very valuable collection for research work. Access to this herbarium is permitted only to post-graduate students, and no plants can be lent out to other institutions, according to provision in the terms of donation. About forty thousand unmounted specimens of the Greene collection of plants are at present kept in Science Hall and are being mounted and added to the aforesaid collection from time to time. The Rev. Dr. John A. Zahm Dante Collection, one of the most complete in the United States, contains works in forty languages on the father of Italian Literature.

The Orestes A. Brownson Philosophical Library, purchased from the heirs of the great philosopher, who commanded universal respect of the intellectual leaders of his age, is a separate reference collection for use of students of philosophy. It contains 3,000 volumes. Another rapidly growing collection is the Hiberniana, organized as the Irish National Library Foundation. Its purpose is to perpetuate Irish scholarship by placing within reach of all who are interested in the history and literature of Ireland all such resources obtainable in America and abroad. The South American library collection and museum forms an important part of the course in foreign Commerce. It was established by the Rev. Dr. J. A. Zahm, C. S. C., who devoted ten years to gathering this library, which for the study of South American history and commerce is the most select in this country. This collection of books, which numbers fifteen hundred volumes, is supplemented by a valuable collection of maps and several hundred photographs and stereopticon slides illustrating various sections of Latin-America.

The reading rooms can conveniently accommodate one hundred students each. In addition to this, the cubicles in the stacks provide room for ninety more. There are also facilities for doing special work in the seminar rooms located on the upper floor. Nothing has been omitted to give the greatest possible efficiency to the library.

WASHINGTON HALL

This hall is 170 feet in length, 100 feet in width, and about 100 feet in height. It contains the rooms of the Department of Music, the club rooms for Brownson Hall, and the University Theater. The theater is elaborately equipped with stage settings. It will seat 1,200 persons. Lectures by men eminent in public and professional life are given here. Concerts and plays by professional companies are also presented in this theater. The dramatic clubs of the University present plays annually.

SCIENCE HALL

is situated a few steps south of Washington Hall. Its dimensions are 105 by 131 feet, and it is three stories in height. A large central space, the full height of the building is occupied by a museum containing mineral, fossil and biological specimens. The departments of Physics, Mathematics, Botany, Zoology, and Biology have recitation rooms and laboratories in this building. The equipment for each of these departments is extensive and complete. Description of the equipment will be found later in this bulletin.

THE MUSEUM

connected with the departments named above, is well arranged for convenience of study. The zoological collection on the second floor at present fills sixteen large cases and represents typical forms of all the orders and genera of vertebrate and invertebrate animals. A large collection of representative vertebrate skeletons forms a considerable part of the museum.

Facilities for the publication of research on subjects of natural history are afforded in the pages of the *American Midland Naturalist,* which appears bimonthly from the laboratory of botany at the University.

The collections in Geology and Mineralogy occupy the first floor. These collections contain a carefully classified collection of minerals and ores; a large geological collection. Some of the specimens here are of the rarest fossil remains of animal and plant life.

CHEMISTRY HALL

The new Chemistry Hall is a three-story building directly south of the Gymnasium, facing west. It is 139 by 52 feet, with a rear extension 77 by 66 feet. The top floor is devoted to the large laboratories of Inorganic, Qualitative, Organic, and Electro-analytic Chemistry, together with private laboratories, research rooms, and a commodious stock room for immediate needs. The second floor is occupied by the Department of Pharmacy and by the laboratory of Quantitative Analysis together with two large lecture rooms and two small class rooms. On this floor also are the drug store, the laboratories for Physical and Technical Analysis, the Museum, and the Library. The basement is devoted to the Department of Mining, Agricultural and Industrial Chemistry together with space for Constant Temperature work, a repair shop, a Reserve Stock Room, two class rooms, and suction and blast machinery.

HOYNES COLLEGE OF LAW

The building devoted to the courses in Law has been named to honor Colonel William J. Hoynes, Dean of the College of Law from 1882 to 1917. It is the most commodious of the group devoted to class purposes, and has two very large lecture rooms, an equally large court room for the trial of cases, and a large library room. Each of the rooms is twenty-five feet in height admitting light through large semicircular topped windows which lend dignity to the architecture. The library contains 7,000 volumes of State Reports, Federal Reports, State Statutes, the various sectional Law Reporters, and standard texts used in teaching law.

ENGINEERING HALL

This building is situated in the southern section of the campus, and is a large two-story brick structure, well lighted and heated. The lower floor contains the mechanical laboratory, machine shop, blacksmith shop, and foundry. The second floor provides the shop for wood-work and also contains a well-lighted drawing room where students in Designing may consult complete workings of the best steam engines and pumps to be found on the market. In this building are likewise the dynamo laboratory, the designing room, and class rooms of the Electrical Engineering department.

THE GYMNASIUM

The Gymnasium is a building 220 by 100 on the ground. The track-hall is now 100 by 180 feet on the ground. It is used for indoor meets, winter baseball practice, and basketball. The gymnasium hall is 100 by 40 feet, and is furnished with a full set of apparatus; below that are the offices, dressing rooms, and shower baths. Friends of the University and the alumni contributed generously to the fund for rebuilding the gymnasium.

Cartier Field is an enclosed field for athletic games. There is a permanent grandstand near the baseball diamond, and permanent stands near the running track, and along both sides of the football rectangle.

The field contains fifteen acres of ground, and is a gift to the University from Mr. Warren A. Cartier, C. E., of the Class of '87.

THE OBSERVATORY

This building is located near Science Hall and is designed for an equatorial telescope and for a transit or meridian circle. The equatorial telescope now in the building is intended for students of astronomy, and is in use whenever favorable weather permits.

THE INFIRMARY

This building, 100 feet by 45 feet in ground measurement and three stories in height, contains rooms for the use of students during illness. The sick are cared for by Sisters of the Holy Cross, and the University physician visits them daily when necessary.

THE RESIDENCE HALLS

SORIN HALL

This building is 144 feet in length, with two wings 121 feet in depth. It has a basement and three high stories, and contains 110 private rooms for advanced students; there are baths and toilets on each floor. These rooms are furnished, and students of full senior or junior standing in any of the colleges may be lodged here. On the first floor there is the chapel. The building is lighted with electricity and heated with steam. In the basement are the recreation and reading rooms.

CORBY HALL

Corby Hall is another residence building. It has three stories and a basement, with baths and toilets on each floor, and is 240 feet in length. There are 125 private rooms for sophomores, with recreation rooms and a chapel. The building is lighted with electricity and heated with steam.

WALSH HALL

This building is situated south of Sorin, fronting the quadrangle. Its dimensions are 230 by 41 feet, and it is four stories high. It faces east and all the front rooms are made up of suites, each consisting of a commodious study room, flanked on either side by a bedroom. Attached to each suite is a private bath and toilet. Each room is supplied with hot and cold water. The rear rooms are singles. The general toilet and bath rooms are of hollow, fire-proof tile, walls and ceilings covered with wire lath and plaster, making practically a fire-proof building. It is equipped with a distinct system of standpipes for fighting fire. The entire corridor floors are built of reinforced concrete, covered with Roman ceramic mosaics. In finish and equipment Walsh Hall is believed to be the best college dormitory building in America. It embraces three stories besides the admirable basement and attic, and it is capable of accommodating a hundred and fifty students.

BADIN HALL

Badin Hall is located in the southwestern portion of the campus, and is devoted chiefly to living and study rooms. In this building there are one hundred and thirty rooms, in which freshmen live. It has recently been remodeled and enlarged and is one of the most acceptable and up-to-date residence halls on the campus. Each room has running hot and cold water. It contains the college restaurant also.

BROWNSON HALL

Brownson Hall occupies the east wing of the Administration Building and contains the living and study quarters of students living under the common-room system. There is a common study hall, a common lavatory, and two large sleeping rooms in which each student has an alcove curtained to secure a personal privacy. Experience shows that the discipline of these common rooms works admirable effects on students who have not yet contracted solid habits of study.

CARROLL HALL

Carroll Hall is in the west wing of the Administration Building. It is in all respects similar to Brownson Hall.

OTHER BUILDINGS

There are numerous other large buildings connected with the University: Holy Cross Hall, Dujarie Hall, the Community House, the Presbytery, the Scholasticate, the printing plant containing the University Press, and the power house.

SYSTEM OF INSTRUCTION

The entire plan of studies is based on the modified elective system. The student is free to select his own curriculum conformably to his natural liking, the career in life he may have in view, or the determinate intellectual bent developed during his secondary school years; but, though he is free to elect his own studies, he has not, however, unlimited freedom in this respect. The principle of general election is modified. Lest the young freshman in his inexperience choose unwisely, he is aided in making his choice of studies by being permitted to select from among a number of parallel programs leading to baccalaureate degrees. Twenty programs are open for his choice in the colleges, each embracing courses which, in the opinion of the Faculty, contribute best to cultural, scientific, or professional knowledge. These programs are, in some cases, made elastic by the introduction of elective courses, especially in the Junior and Senior years. Students who wish to spend a limited time in study and cannot complete all the courses in a program for a degree may register as special students and elect any course for which their preparation has fitted them.

The hours scheduled in the different programs are credit hours based on the average amount of time required for preparation of recitations. One hour of recitation is regarded as the equivalent of at least two hours of laboratory work. The minimum number of credit hours which a student must carry is fifteen, the maximum number which he may ordinarily carry is twenty-two. The number is not the same in all the colleges. Students who wish to take more work than is indicated by the maximum number for a particular college must apply to the Faculty by formal petition for permission to do so. This will not be granted unless a student is carrying his regular work with distinction.

REGULATIONS GOVERNING ADMISSION TO THE COLLEGES

Candidates who wish to enter any of the colleges must present evidence, either be examination or by a properly attested certificate, of ability to enter on the courses of the freshman year. Fifteen units are required for entrance. One year of college work is required for entrance to the College of Law. The units, required and elective, are given in the table on page 28.

Examinations in all the subjects required for admission to the University are held at Notre Dame in September, the beginning of the fall term, and in February, the beginning of the spring term.

A student who presents only fourteen satisfactory entrance units may, at the discretion of the Committee on Admission, be admitted to the freshman year as a conditioned freshman. This deficiency must be made up within one school year. Only when the condition is removed will the student be admitted to full standing in his class.

Students who have completed a four-year course in high schools or preparatory schools of recognized standing will be admitted without examination to the freshman year of any program to which their preparatory studies entitle them.

Candidates for admission to advanced standing who are required to take examinations must pass, *in addition* to the usual entrance examinations, an examination in the work already done by the classes they desire to enter. The additional subjects may be found in the several programs of studies described later in this bulletin.

Applicants for advanced standing who present certificates from other colleges or universities may be received, at the discretion of the Faculty, with or without examination as regards particular cases.

No student will be admitted to any course of the senior year until all conditions have been cancelled.

Catholic students are required to take the prescribed courses in Evidences of Religion.

It is recommended that Latin, modern language or history be taken as electives under the Department of Letters; that modern languages, or science be taken as electives under the Departments of Science, Engineering, and Architecture; that French be the language chosen for Architecture.

There are classes specially arranged for those who do not present credits for Trigonometry, Elementary Chemistry, and Physics; the same holds true for elementary courses in Modern Languages.

CONDITIONS AND FAILURES

The passing grade in all classes is 70%. If a student fails to obtain a passing grade in one examination in a semester class or in one or two examinations in a year class, he is conditioned.

A student who fails to pass a condition examination must repeat the class work in which he has been conditioned.

A student who fails notably on account of negligence or lack of application in two quarterly examinations must withdraw from the University. A class which is discontinued except by permission of the Director of Studies for a sufficient reason is considered a failure.

The class-standing of conditioned students is rated according to their lowest condition. A student, for example, who is carrying sophomore or junior classes but has respectively a freshman or sophomore condition will be rated as a freshman or as a sophomore, as the case may be.

Examinations for the removal of conditions incurred in the first three quarters of the school year will be given in May. Conditions incurred in the fourth quarter are to be removed by examinations in October.

No student who has a condition in any subject required in his course can begin his senior year of resident study until such condition is renewed. Examinations for the removal of conditions incurred in the last quarter of junior year will be given on the registration days in September.

A conditioned junior may be granted permission to take senior subjects as an unclassified student, but his required year of senior residence cannot begin until all conditions are removed. If a conditioned student carries all his senior subjects and does not remove his conditions until the end of the first semester, he must then complete the second semester of that year and in the first semester of the following year must carry twenty hours of classwork a week in courses selected with the approval of the dean of the school and the head of the department in which he expects to take his degree.

ABSENCE FROM CLASS

Two per cent is deducted from the bulletin grade for each absence from class. For absence from class on the days immediately preceding or following a vacation the following deductions are made: Five per cent for the first day, four per cent for the second day, three per cent for the third day, and two per cent for each day thereafter.

A special committee of four faculty members supervises absences from class. The purpose of this committee is to decide upon the validity of the excuse given for the absence and to determine whether the student is entitled to a cancellation of the penalty for the absence and to make up work lost.

A student who has been absent from class for a serious reason must make a written statement of his excuse. This is to be left at the office of the Director of Studies, and must be presented not later than two days after the absence. If presented later it will not be considered by the committee.

Ordinarily the only valid excuses for missing class are: (a) leave of absence from the University granted by the President or the Prefect of Discipline for a necessary cause; (b) illness of the student in the infirmary or hospital.

In case of absence from the University the written excuse presented to the Committee must have the approval of the Prefect of Discipline. In all other cases the excuses must have the approval of the rectors of the halls.

The committee keeps a complete record of absences, and all absences recorded for which a valid excuse has not been given will be considered inexcusable absences. When six inexcusable absences have been accumulated the student is notified. At the next report of an absence without valid excuse, parent or guardian is notified. When the student has accumulated twelve unexcused absences he is suspended for thirty days.

The committee reports excusable absences to professors, who will then notify the student. This cancels the two per cent penalty for the absence and authorizes the professor to assign work for all credit lost by the absence.

Entrance Requirements for Various Colleges in Subjects and Units.

COLLEGES

SUBJECTS	ARTS AND LETTERS*		SCIENCE§	ENGINEERING	ARCHITECTURE
	Units	Units	Units	Units	Units
English	4	4	3	3	3
Latin	4	2	2		
Greek	3	or	or		
French, German or Spanish		2	2	2	2
History	1	1	1	1	1
Algebra	1	1	1½	1½	1½
Geometry	1	1	1½	1½	1½
Chemistry	‡	‡	1	1	1
Physics			1	1	1
Botany, Physiology Zoology, Physiography					
Elective		5	4	4	4
Total	15	15	15	15	15

* Including Departments of Classics, Letters, History, Economics, Journalism and Commerce.

‡ For admission to the College of Arts and Letters one unit of Science is required.

§ Including Pharmacy, Agriculture and Pre-Medical Programs.

For admission to the College of Law one year of college work is required.

DEGREES

Degrees are conferred only on regular students who have satisfied the full entrance requirements and have completed satisfactorily the courses prescribed. One hundred and twenty-eight semester hours are required as a minimum for graduation from any of the four-year programs of study. Written theses and formal examinations are demanded of all candidates for degrees. One full scholastic year of resident study is absolutely required.

BACHELORS

The courses of study offered to candidates for the degree of Bachelor extend by fixed programs throughout the four scholastic years.

The College of Arts and Letters offers eight degrees:

- Bachelor of Arts (A. B.);
- Bachelor of Letters (Litt. B.);
- Bachelor of Philosophy (Ph. B.);
- Bachelor of Philosophy in Journalism (Ph. B. in Journ.);
- Bachelor of Philosophy in Commerce (Ph. B. in Commerce).
- Bachelor of Philosophy in Foreign Commerce. (Ph. B. in For. Com.)
- Bachelor of Music (B. Mus.)
- Bachelor of Library Science (B. L. S.)

The College of Science offers six degrees:

- Bachelor of Science (B. S.);
- Bachelor of Science in Biology (B. S. in Biol.);
- Bachelor of Science in Chemistry (B. S. Chem.);
- Bachelor of Science in Pharmacy (B. S. in Ph.);
- Pharmaceutical Chemist (Ph. C.);
- Bachelor of Science in Agriculture (B. S. A.).

The College of Engineering offers eight degrees:

Civil Engineer (C. E.);
Mechanical Engineer (M. E.);
Electrical Engineer (E. E.);
Mining Engineer (E. M.);
Chemical Engineer (Ch. E.);
Industrial Engineer (I. E.);
Bachelor of Architecture (B. Arch.);
Bachelor of Architectural Engineering (B. A. E.).

The College of Law offers one degree:

Bachelor of Laws (LL. B.).

There are two-year courses in Commerce, Pharmacy, Agriculture, Mechanical, and Electrical Engineering, and Architecture, leading to certificates of proficiency.

The degree of Bachelor will not be conferred unless the candidate shall have been in residence for one complete scholastic year in his *senior* year of study.

REQUIREMENTS FOR THE MASTER'S DEGREE

As a prerequisite for the master's work in the College of Arts and Letters or in the College of Science, the student must hold a bachelor's degree in a liberal college course from the University of Notre Dame or from some college whose degrees are recognized by the University.

The candidate must spend in resident study at the University one regular school year or four summer sessions.

The student shall follow a major course of study and one or two minor courses, to be selected by the student himself and approved by the professor under

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No degree is conferred *in honorem* except the degree of Doctor of Laws (LL. D.)

whom the major course is followed and by the dean of the college. Thirty-two credit hours of graduate work are required, as follows: sixteen credit hours in the major subject and sixteen in the minor subject or subjects. With the approval of the head of the department, eight credit hours may be earned by the student's passing satisfactory examinations on matter studied outside the University. A dissertation on some phase of the major subject is to be submitted to the professor of that subject at least one month before the time at which the degree is to be conferred. In the College of Arts and Letters this dissertation must consist of not fewer than five thousand words.

The candidate must have a reading knowledge of one foreign language other than those which may be studied as major or minor courses.

As the final requirement the candidate must pass examinations, written or oral or both, as may be required, in the major and minor subjects and in the subject-matter of the dissertation.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

The candidate for the Doctor's degree must have a Bachelor's degree from the University of Notre Dame or from some other college of good standing. Before beginning the second year of work he must satisfy the Faculty that he has a reading knowledge of French and German.

Three years or resident graduate work are required. Resident graduate work done in another university may with the approval of the Graduate Faculty be accepted towards a degree in this University, but at least the last two semesters of graduate study must be done at Notre Dame. No work *in absentia* will receive credit, except that done in the preparation of the dissertation.

The mere pursuit of graduate study for the prescribed time will by no means entitle the candidate to a degree; he must show marked proficiency in his field of study and special aptitude in research.

The candidate will pursue three courses of study, a major, a principal minor, and a secondary minor. All courses must have the approval of the Graduate Faculty.

Three typewritten copies of the dissertation must be submitted to the dean of the Graduate School not later than March 1st of the year in which the candidate wishes to obtain his degree. If the dissertation is approved, one hundred printed copies must be deposited with the Librarian before commencement at which the degree is to be received, unless publication having been arranged for, is delayed by circumstances.

There will be oral and written examinations on the subject matter of the major, minors, and dissertation, as prescribed by the Graduate Faculty.

SPECIAL STUDENTS

Students who do not wish to become candidates for a degree by following the prescribed courses of any program, may register as special students and attend any of the courses of instruction for which their previous academic training has fitted them. Such special students are governed by the same regulations and discipline as the other undergraduates. They are required to pass the regular examinations in whatever courses they may pursue. In exceptional cases men of mature age, who have been out of school or college for several years, but whose training in practical affairs has been sufficiently educative, will be accepted as special students by satisfying the Faculty of their ability to pursue with profit certain courses of instruction.

On leaving the University special students may receive, on application, certificates stating their proficiency in the classes they have followed.

Students who do not take the regular four-year program in Commerce, Pharmacy, Agriculture, Architecture, Electrical or Mechanical Engineering, but who complete the two-year programs of study will receive certificates for the work done. The conditions for receiving these certificates are given later on in this bulletin.

PRIZES

The following prizes and honors within the gift of the University are awarded annually under conditions named below. Any of these prizes may be withheld by the Faculty if the student incurs serious censure for violating any of the regulations of the University.

THE QUAN MEDAL FOR CLASSICS

A gold medal is yearly given to the student who has obtained the best record in the senior year of the classical program. The medal is the gift of Mr. William J. Quan, of Chicago, and is awarded only on condition that the record of the student is notably good in all the courses of instruction prescribed for the senior year.

THE BREEN MEDAL FOR ORATORY

This prize is the gift of the Honorable William Patrick Breen, of the Class of '77, and is annually awarded to the student who excels in oratory. The award is made by a committee of three, selected by the Faculty and after a public competition. The winner represents the University in the Indiana State Oratorial Contest held on the third Friday in February. No student may receive the Breen Medal more than once, but the winner of this prize may compete again for the honor of representing the University in the State Contest.

There is also a ten-dollar prize offered to the winners of the freshman, sophomore, and junior contests in oratory.

THE MEEHAN MEDAL FOR ENGLISH ESSAYS

A gold medal, the gift of Mrs. Eleanor Meehan, of Covington, Ky., is awarded every year to the senior (undergraduate) who presents the best essay in English. Essays offered in competition may be on any subject approved by the head of the Department of English. The essay must be notably meritorious.

THE MARTIN McCUE MEDAL FOR CIVIL ENGINEERING

The McCue Medal for Civil Engineering, presented by Mr. Warren Antoine Cartier, C. E., of the Class of '87, is awarded to the student of the Department of Civil Engineering who has obtained the best record in all the courses prescribed in the program. The medal is awarded only when the student's record has attained a fixed standard. In computing the grades the courses in mathematics count fifty per cent. Only students who have been in residence for four full years are eligible to compete for this prize.

THE JOSE CAPARO MEDAL FOR ELECTRICAL ENGINEERING

This medal, founded in memory of his deceased father, by Jose Angel Caparo, of the class of '08, is awarded to the student of the Department of Electrical Engineering who has obtained the best record in all the courses prescribed in the four-year program of Electrical Engineering. The medal is awarded only when the student's record has attained a fixed standard.

THE BARRY MEDAL FOR ELOCUTION

The Patrick T. Barry Medal, the gift of Mr. Patrick T. Barry, of Chicago, is awarded every year for excellence in elocution. The award is made after competition in public.

THE DOCKWEILER MEDAL FOR PHILOSOPHY

The Dockweiler Medal for Philosophy, founded by Mr. Isidore B. Dockweiler, of Los Angeles, California, in memory of his deceased father, Henry Dockweiler, is awarded to the student of the College of Arts and Letters, senior year, who submits the best essay on some philosophical theme. The medal will not be awarded unless the essay attains a certain standard of excellence.

THE MONSIGNOR O'BRIEN PRIZE

This prize, founded by the late Edwin O. Wood (LL. D., '16) in honor of the Right Rev. Monsignor Frank A. O'Brien, LL. D., of Kalamazoo, Michigan, is a gold medal awarded for the best essay on any topic dealing with the history of the Northwest Territory.

MEDALS FOR PUBLIC DEBATING

A debating medal is awarded to each of the students who represent the University in the principal intercollegiate debates of the year.

DISCIPLINE

Official report of each student's class standing will be sent to parents or guardians quarterly.

The University believes that an education which gives little attention to the development of the moral part of a youth's character is pernicious, and that it is impossible to bring about this development where students are granted absolute relaxation from all faculty government while outside the class-room. A young man must learn obedience to law by the actual practice of obedience. Moreover, the quiet and concentration of mind that are needed for college work are not obtained except where discipline exists. Therefore, certain regulations, shown by experience to be salutary, are enforced at the University.

The campus includes more than a square mile of park, and students are expected to take their recreation on the campus rather than in loitering about the city. College life lasts only four years as a rule, and the special charm of it lies in the points wherein it differs from the life of the city rather than in the points wherein it resembles that life. These are the years during which young men dream dreams and see visions. These are the years during which the beautiful and the abiding friendships of after-life are formed and cultivated. It is almost a sacrilege to cheapen and vulgarize a college by reducing it to the level of a mere class-room exercise and by stripping it of all that makes it distinctive and memorable in the experience of youth. Therefore, students of Notre Dame are expected to find their chief interest on the campus and in the companionship of college friends, rather than in the distractions of the city. Of course no attempt is made to shut out the life of the town altogether, but the matter is regulated by wise rules which are made known to the student at the beginning of the year, and which the young men themselves frankly approve and loyally keep.

There are certain offenses which inevitably involve separation of the student from the University. These are: habitual disobedience to college regulations, cheating in examinations, the use of intoxicating liquors, any form of impurity, the use of profane or obscene language, and habitual laziness as regards study. In cases of suspension or expulsion tuition fees are not returned.

Tobacco is not forbidden to students of seventeen years of age and upward.

Although students of all religious denominations are welcomed and are made to feel as much at home as they would be in the bosom of their own family, and although both the Faculty and the students avoid controversy or anything else that could wound the most delicate susceptibilities of our non-Catholic friends, nevertheless it ought to be frankly stated that the University is in the fullest sense a Catholic institution, and while no effort is made at proselytism, all students, as a matter of college regulation and discipline, are required to attend divine services in the University church at stated times.

Undue attention to athletics at the expense of study is not permitted, but students are encouraged to take part in manly sports, for which the large campus, the spacious gymnasium, and the general condition of student life at Notre Dame afford special advantages. All athletic associations among the students are strictly forbidden to countenance anything that savors of professionalism. The whole question of athletics is governed by a Faculty board of control, which will be guided in its rulings by the regulations adopted by the leading colleges of the country. Seven members of the Faculty and three graduate alumni compose this board, and they reserve the right to a final decision on all questions concerning athletics.

In general the question of discipline at Notre Dame resolves itself into a high-minded devotion to the noblest ideals of college life. No young man of gentlemanly instincts and aspirations ever finds any of the regulations burdensome. No other kind of young man is either desired or tolerated at Notre Dame. The ideal of the University is not necessarily a large school, but rather a college home where young men who value a clean character as well as a well-stored mind may associate with their own kind under the influence and direction of men of refinement and power.

LECTURES AND CONCERTS

Each year, eminent men are invited to lecture before the students. Among those who have addressed the University in past years may be noted five Apostolic Delegates, Cardinals Satolli, Martinelli and Falconio, Monsignors Agius and Bonzano; Cardinals Gibbons and Farley; Archbishops Ireland, Riordan, Keane, Glennon, Christie, Spalding, and Hanna; and Bishops Alerding, McQuaid, Maes, Muldoon, O'Gorman, Shanley, Hickey, Lillis, MacSherry, Curley, Schrembs, and Glass. There were also such noted European churchmen as Monsignor Benson, Abbe Felix Klein, Bishop, John S. Vaughan and the foremost of living English historians, Cardinal Gasquet; also men of letters like Rev. D. J. Stafford, Marion Crawford, Maurice Francis

Egan, Henry Van Dyke, Seumas MacManus, William Butler Yeats, James Jeffrey Roche, Wilfred Ward, Hamilton Wright Mabie, Frank Spearman, Joyce Kilmer, T. A. Daly, Louis Wetmore, Opie Read, Bliss Perry, Leland Powers, Henry James and the Rev. John Talbot Smith; and such men of affairs, as ex-President Taft, ex-Vice-President Fairbanks, ex-Senators Beveridge, Gearin, Hill, Senators Walsh, Watson, ex-Attorney General Charles Jerome Bonaparte, Representative J. Adam Bede, the Honorable William P. Breen, Bourke Cockran, Admiral W .S. Benson, Secretary of the Navy Daniels, Secretary of the Treasury, William McAdoo, Judge Victor J. Dowling, Judge Morgan O'Brien, Judge Ben Lindsey, Joseph Scott, Dr. James C. Monaghan, Willis M. Moore, the Honorable Edward McDermott, His Excellency Wu Ting Fang, ex-Secretary of State, William Jennings Bryan, Vice-President Marshall, Senator B. F. Shively, Max Pam, Samuel Gompers, Governors J. Harmon, J. Cox and S. M. Ralston, Whitman, Goodrich, Hannis Taylor, Cecil Chesterton of England, and Chief Justice Fitzpatrick of Canada.

During the year 1919-20 the University offered a course of public lectures and concerts in Washington Hall, in addition to the regular and special lectures required by the courses of instruction. The course was as follows:

CONCERT AND LECTURE COURSE, 1919-1920

1919		
Oct.	25	Mr. Mark Sullivan, "Reporting the Peace Conference."
Oct.	29	Mr. Charles Gorst, "Birds."
Oct.	31	President Eamon De Valera of Ireland.
Nov.	10	Mrs. Joyce Kilmer, "Modern Poets."

Nov.	11	Mrs. Joyce Kilmer, "Modern Poets."
Nov.	14	Mme. Galli Curci, Song Recital.
Dec.	1	The Reverend John Cavanaugh, C. S. C., "The Catholic College Man in National Public Life."
Dec.	6	Orpheus Four, Male Quartette.
Dec.	10	Hon. Edward Dunne, Ex. Gov. of Illinois. "The League of Nations."
1920		
Jan.	10	Great Lakes Stringed Quartette.
Jan.	17	Criterion Male Quartette.
Jan.	24	Mr. Francis Kilkenny, "Modern Banking."
Feb.	2	Ng Poon Chew, "The Shantung Question."
Feb.	7	Dr. Patrick O'Reilly, Maynooth College, "The Chinese Missions."
Feb.	10	The American Syncopated Orchestra.
Feb.	14	Joseph Konecy, Violinist.
Feb.	18	Notre Dame Band.
Feb.	23	The Detroit Symphony Orchestra.
March	6	Dr. Maurice DeWulf, Louvain University. Scholastic Philosophy.
March	7	Dr. Maurice DeWulf, Louvain University. Scholastic Philosophy.
March	18	Mr. Frederick Paulding, "The Merchant of Venice."
March	19	Mr. Frederick Paulding, "The Rivals."
March	21	Shacha Jacobinoff, Violinist.
March	24	Notre Dame Glee Club.
March	27	Notre Dame Players Club.
April	10	Kryl's Orchestra.
April	21	Mr. William Rogerson, Chicago Opera Association. Song Recital.
April	24	Miss Helen Guilfoyle and Miss Josephine Decker, Song Recital.
May	12	Mr. Leland Powers, "Monsieur Beaucaire."
June	13	Hon. Morgan J. O'Brien, "Safeguarding the Constitution."

The newest photo-plays are given weekly during the winter season.

STUDENT SOCIETIES

There are several literary and debating societies in the University which do such creditable work at their meetings and in preparation for them that their work takes on the nature of added courses of instruction. In each society a member of the Faculty acts as adviser. An Inter-Hall League has been formed and public speaking has always received special attention at the University. In thirty-three public debates with other universities and colleges Notre Dame met but three defeats—the decision of the judges in the greater number of these debates being unanimous. The University Dramatic Club stages plays annually for presentation in public. The University Band, the University Orchestra and the University Glee Club also appear regularly in concerts.

Students of the Departments of Civil and Electrical Engineering have each a society in which papers on engineering subjects are read and discussed. Men prominent in their profession are invited to lecture to these societies. The Pharmaceutical Society meets to discuss subjects of interest in the world of pharmacy. The School of Journalism has a special club for each of the years of the course. The Chamber of Commerce organized from among students in the department of Commerce meet every week for the reading of papers on foreign and domestic trade and the problems presented in the world of business. Men eminent in commercial life are invited frequently to address this Chamber of Commerce. In other departments where no such formal organization has been effected similar results are reached by seminars.

NECESSARY EXPENSES

The following necessary expenses are payable on the entrance of the student:

Matriculation fee (payable the first year only)........	$ 10.00
Tuition for first half school year	75.00

Board for the first half of school year	187.50
Library fee, and Special Lecture, Entertainment and Concert Course	10.00
Use of Gymnasium and Natatorium and admission to intercollegiate football, baseball, basketball and track contests throughout the year	10.00
Laundry for the first half of school year. (Estimated)	15.00

The following expenses are payable January 15:

Tuition for the second half of school year	75.00
Board for the second half of school year	187.50
Laundry for the second half of school year. (Estimated)	15.00

With the first payment for Board and Tuition must be included the Incidental Expenses enumerated above together with any Extra Expenses the Student may wish to incur, such as charges for Private Room or Special Courses (listed below); likewise Laboratory Fees which will be found listed farther on in this Bulletin before the programs of courses in each of the colleges.

PRIVATE ROOMS

Room in Sorin Hall	$85.00 and upwards
Room in Corby Hall	$75.00 and upwards
Room in Badin Hall	$85.00 and upwards
Room in Walsh Hall	$130.00 and upwards

Lodging in Brownson and Carroll Halls, $40.00 in addition to board and tuition.

Note: Sorin Hall is reserved for Seniors and Juniors.
Corby Hall is reserved for Sophomores.
Badin Hall is reserved for Freshmen.
Walsh Hall is reserved by classmen of any year.

IMPORTANT NOTICE

Since September, 1917, students desiring either cheaper or more expensive meals than the college commons have been permitted to take their meals in a cafeteria and restaurant established on the campus. While under the general supervision of the University, the restaurant is not managed by it. Prices are the same as in similar restaurants elsewhere. Students arranging for college commons will not be permitted to make any change in the middle of the semester, but will be rquired to wait until the completion of the half year. The same rule applies to students choosing the restaurant for their place of board.

Credit for books, stationery, clothing and other purchases will not be given to students unless a deposit has previously been made for this purpose.

No rebate will be allowed for time of absence at the opening of the terms, September and February. The charge of $75.00 per half-year for tuition is accepted as an entirety and will not be refunded in whole or in part if the student be dismissed for willful infraction of the University regulations; and so likewise in the event of his withdrawing from the University at any time without proper permission. An exception is made if it seems expedient for him to go home because of protracted illness. Degrees will not be conferred on any student whose account with the University has not been settled.

No student will be entered for the second term whose account for the first term has not been adjusted.

OPTIONAL EPENSES PER YEAR

Payable in Advance.

Lessons on Piano and Use of Instrument—Advanced Students $150.00; Elementary	$100.00
Use Only of Piano for Advanced Students	50.00
Lessons on Violin—Advanced Students $120.00; Elementary	100.00
Lessons on Organ and Use of Instrument	120.00
Lessons on Guitar, Banjo, Mandolin	50.00
Lessons on Brass and Wind Instruments	80.00
Lessons in Voice and Use of Piano	150.00
Theory of Music—Private Students $120.00; Classes, per Student	20.00
Special Course Church Music	50.00
Artistic Drawing	50.00
Elocution—Special Course	25.00
Typewriting—Full Course	20.00
Phonography	15.00
"Scholastic"—College paper	2.00

GRADUATION FEE

Bachelor Degrees, $10.00; Master Degrees, $15.00; Doctor Degrees, $25.00; Certificates, $5.00.

REMARKS

Term bills and other accounts are subject to sight draft if not paid within ten days after they have been rendered.

Remittance should be made by draft, post office money order or express money order, payable to the order of the University of Notre Dame.

Checks on local banks are not desirable, and exchange will be charged in all cases.

Degrees will not be conferred on any student whose account with the University has not been settled.

Students whose accounts are not settled will not be admitted to the final examination for degrees or certificates.

Statements of academic credits will not be furnished to students on leaving the University if their accounts are not entirely paid.

A limited number of student waiters, clerks and library assistants can be received at reduced rates. For conditions of entrance see statement in Student Employment.

Students wishing to spend their Summer Vacation under the care of the University authorities can be accommodated at San Jose Park, Lawton, Michigan. The charge for the vacation at San Jose Park is $175.00. Classes two hours per day are included in this arrangement. Special tutoring at professor's rates.

A Summer School extending over six weeks, approximately from July 1 to August 10 was established in 1918. Bulletin on application.

STUDENT EMPLOYMENT

A limited number of young men may secure employment at the University as waiters on table, clerks in the University offices and the Library, and as assistants to Professors. The compensation per hour depends on the quality of the work performed, and is credited as an allowance on the cost of board and tuition. The conditions for appointment of student employes are (1) the completion of a full high school course; and (2) letters of recommendation, one from the student's pastor.

As the University depends for its maintenance on the fees paid by students the number of student employes living at the University is necessarily limited. However the Employment Bureau, so far as possible, secures positions of various kinds for such self-supporting students as can not find places in the University, with the business and professional men of South Bend, for work to be performed after class-hours. Students so employed room and board in the city. Information regarding employment of students may be obtained from the Employment Bureau.

SCHOLARSHIPS

The University has at present only a few foundations which yield revenues for the partial support and tuition of certain students annually. Assignment of these scholarships is made under restrictions indicated with each gift. No student will be continued in the enjoyment of a scholarship whose superiority in college work is not clearly indicated in his first year of residence. Nor will a student who has incurred serious censure by breach of the regulations of the University be considered as a candidate for a scholarship.

It is a matter of great regret that the lack of endowment makes it impossible for the University to assist a greater number of deserving students who are not able to pay the charges of board and tuition. Under conditions indicated on page 44 of this bulletin a limited number of student-waiters can be received at reduced rates. Certain clerkships in the University offices and positions in the library are also open to worthy young men. Information regarding the assignment of these places will be furnished by the Student Employment Bureau. The University is doing all in its power to assist students in narrow circumstances. The friends of Notre Dame are asked to aid in this work.

THE JOHNSON SCHOLARSHIP

In 1899 Dr. Edward Johnson, of Watertown, Wisconsin, gave a fund of four thousand dollars, the income of which aids in the support of one student annually. By the terms of the gift assignment is made only to a student who intends to enter the priesthood.

THE CARROLL SCHOLARSHIP

The Rev. Thomas Carroll, of Oil City, Pennsylvania, bequeathed five thousand dollars in 1899. The terms of the bequest specify that the income shall be used to aid a student from Oil City.

THE FORD SCHOLARSHIP

In 1900 Mrs. Catherine Ford, of Chicago, gave to the University certain properties to provide scholarships for worthy students. The income arising from this gift is sufficient to pay the tuition fees of two students. By the wish of the donor nomination for these scholarships are made from St. Jarlath's parish. Chicago.

THE PATRICK O'BRIEN SCHOLARSHIP

When Mr. Patrick O'Brien ,a distinguished citizen of South Bend, Indiana, died in August, 1913, the family, interpreting his oft-expressed wish, established a memorial scholarship of seven thousand dollars for which college men and graduates are eligible. This scholarship may be administered as two half-scholarships. There are no conditions attached to it except that the holder be of collegiate standing.

THE MURDOCK SCHOLARSHIP

Samuel T. Murdock, (C. E. '86), in June, 1917, deposited with the University the sum of five thousand dollars, the income of which is available for the assistance of needy students. At the present time the value of this scholarship is $300 annually. It may be allotted to one beneficiary, or may be divided between two.

THE FORESTERS SCHOLARSHIP

The Catholic Order of Foresters has made a permanent endowment in honor of the late Professor John P. Lauth, of Chicago. The present annual income from this gift is $60.00. It is available as a partial scholarship.

College of Arts and Letters

Department of Classics

Department of Letters

Department of History

Department of Economics

Department of Journalism

Department of Commerce

Department of Music

Department of Library Science

THE COLLEGE OF ARTS AND LETTERS

From the founding of the University in 1842 to the establishment of the College of Science in 1865 only one program of prescribed courses of instruction leading to a degree was offered to undergraduate students. It embraces studies in the ancient and modern languages, in English literature, in history, the natural sciences and in mathematics. Graduate students might obtain a degree of master for advanced study one year after obtaining the Bachelor's degree. The group of courses was known as the Program of Classics, and the degrees of Bachelor of Arts and Master of Arts were conferred.

The demand of students for greater freedom of election in courses led the University in 1886 and again in 1898 to form other programs which embraced certain studies not contained in the Program of Classics, but which lead to degrees equivalent to the degree of Bachelor of Arts. In the matter of election of courses the student is permitted greater freedom in the program leading to the degree of Bachelor of Letters than in any of the other groups. The degrees now under charge of the College of Arts and Letters are the ordinary degrees of Bachlor of Arts, Bachelor of Letters, Bachelor of Philosophy, Bachelor of Philosophy in Journalism, Bachelor of Philosophy in Commerce, Bachelor of Philosophy in Foreign Commerce, Bachelor of Philosophy in Education, Engineering Administrator, Master of Arts and Doctor of Philosophy.

The location of the University offers special advantages for study. It is situated on a beautiful tract where cultivation has aided nature, two miles from the noisy bustle of city life. This removal from the distractions of the town gives the students opportunity to pursue their work with the quiet and concentration needed for earnest study. Nearly all the Faculty live on the grounds of the University, dine with the students ,and are accessible to them at any time. The benefits derived from this constant association with professors cannot be overestimated.

Facilities for work are found in the libraries and laboratories. The main library has over one hundred thousand bound volumes well selected and several thousand pamphlets and manuscripts. The leading literary and scientific reviews are kept on file. Books may be borrowed under easy regulations. The library contains ample reading room space and is well lighted so that students may use it at night. It is open every day from 8:00 A. M. to 9:00 P. M. There are also special collections of books in the various departments of the College, mainly works of reference.

ENTRANCE SUBJECTS

Applicants who do not present properly attested certificates for preparatory work must take entrance examinations.

English. Part of the examination time is given for answering questions upon the text-books and required readings in the preparatory courses in English; the remainder, for writing an essay.

Latin. Grammar, complete: *Caesar,* four books of the Gallic War; *Cicero,* four orations against Cataline; *Vergil, Aeneid,* six books; translation at sight of passages from *Cicero* and *Caesar;* translations of English into Latin based on the texts of the authors.

Greek. (*For Students in the Department of Classics only.*) Grammar, etymology and general rules of syntax;

Xenophon, Anabasis, four Books; *Homer,* at least three books; prose composition based on text.

History. A general knowledge of the outlines of Greek and Roman History and of Medieval and Modern History, as set out in the texts used in high schools and other secondary schools. American History.

Civil Government. The Constitution of the United States; Federal Government and State Government.

Algebra. The whole subject as far as logarithms, as given in *Wentworth's College Algebra,* or an equivalent in the larger treatises of other authors.

Geometry. Plane and solid, including the solution of simple original problems and numerical examples as given in the works of *Wentworth,* or an equivalent in treatises by other authors.

Physical Geography, Physiology, Botany, Zoology,

Chemistry. Elementary. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations, and laboratory work in which at least fifty experiments have been exemplified.

Physics. Elementary. The preparation in this subject should include a course of lectures, illustrated by experiments and recitations from a text-book similar to *Carhart and Chute's* Laboratory work is required. In both chemistry and physics the laboratory notebook must be presented.

French, German, Spanish. A two years' course in German, French or Spanish is required for entrance on the Program in Letters, the Programs in History, Economics, Journalism, and Commerce.

Subjects required for entrance to Freshman year of the Department of:

CLASSICS

English	4	Mathematics	2
Latin	4	History	1
Greek	3	Science	1

LETTERS, HISTORY, ECONOMICS, JOURNALISM AND COMMERCE

English	4	Mathematics	2
Language	2	Science	1
History	1	Elective	5

THE DEPARTMENT OF CLASSICS

The purpose of the work offered in the Department of Classics is to give students a familiarity with Latin and Greek authors which is not found in mere translations. The result sought is not entirely immediate; it looks rather to a continuation of work that can only be started in an under-graduate course. Students whose future study or effort will bring them in contact with publications in the Latin and Greek, more especially in the Latin, will find this course a great aid, if not a practical necessity. It comprises four years of English, three years of philosophy, three years of Latin and two of Greek, two years of history, a year of economics, a term of politics (American government,) a term of sociology, a year of biology, two years of elocution. There are elective courses in the junior and senior years of study—the elective courses may be advanced work in some of the subjects of the freshman or sophomore years or new topics may be taken up. The studies in the Department of Classics lead to the degree of Bachelor of Arts, A. B. Tradition seems to warrant the reserving of the degree of A. B. for this rather definite line of subjects and to suggest the adoption of other degrees for courses of study that deviate in a large measure from the time-honored A. B.

THE DEPARTMENT OF LETTERS

This Department offers the most elastic program of studies in the College of Arts and Letters. The prescribed subjects include four years of English, three years of history, a year of economics, a term of politics (American government), a term of sociology, a year of biology, three years of philosophy, two years of elocution. The remaining subjects are elective. A student in this department has the opportunity to carry out a rather extended course of study along a definite line in which he is especially interested while he is assured a substantial background of topics of general cultural value. A student might elect mathematics, law, science, accounting. It is well adapted as a pre-medical course or as a preparation for teaching. A student preparing for medicine will find ample time to take the science subjects required for entrance upon the study of medicine. A student interested in teaching will be able to take the subjects he expects to teach. The degree offered is Bachelor of Lettrs, Litt. B.

THE DEPARTMENT OF HISTORY

The purpose of the program of studies offered by the Department of History is to give the student a presentation of the Ancient, Medieval, and Modern periods.

THE DEPARTMENT OF POLITICAL ECONOMY.

This department offers standard courses in economics and politics for students who wish to prepare to teach these subjects or to pursue them for cultural or professional purposes. That economics and politics are normative sciences distinct from, though dependent upon the science of ethics, is a first principle which pervades the teaching of the department.

THE DEPARTMENT OF JOURNALISM

Early in the year 1912, Dr. Max Pam of Chicago, established a Chair of Journalism in the University and made possible a special program of studies leading to the degree of Bachelor of Philosophy in Jorunalism.

In accordance with Dr. Pam's purpose in founding this chair, the program is designed to prepare young men technically for Journalism and at the same time equip them with the essentials of a liberal education. Experience has shown that graduates of this course acquire such familiarity with the practical work of newspaper making as will render their services immediately valuable; at the same time they are required to be well grounded not only in the ethics of their profession, but in general philosophy, in language study, in the principles of economics and in world politics as well as the particular currents in the national life of our country.

The entrance requirements are practically the same as for other departments in the College of Arts and Letters, but the Director of Studies shall have power to admit as a special student any young man who is believed capable of profiting by the work of the course.

Practical experience is furnished in the course. Every graduate must have worked six weeks on the local papers and brought back a satisfactory report from the editors. Every student, earlier in the course, acts as local correspondent for a daily and a weekly paper; and all students obtain departmental experience on the university weekly. *The Notre Dame Scholastic.*

THE DEPARTMENT OF COMMERCE

The courses in Commerce require four years of collegiate work and lead to the degree of Bachelor of Philosophy in Commerce. Two courses of study are offered, the one dealing with Business Administration and the other with Foreign Trade.

A comparison of the studies listed with the studies provided for students following work in Journalism and Economics, will show the possibility of choosing a course that does not necessarily limit the student to the special work in accounting or business methods. A substitution of classes is possible, in such a way as to provide for expert training along the lines of Banking, Advertising, Mercantile and Secretarial work. A student taking this course should have a fair mastery of at least one modern language and a reading knowledge of another.

In addition to the regular studies provided in this course, frequent lectures are given by prominent business men. This has been found to be a very successful method of bringing into the class-room a practical knowledge of the commercial world.

FULL PROGRAM IN COMMERCE

The primary aim of the studies listed under this program is to equip the student for practical work in the business world. The work of necessity is of a specialized nature, and yet the studies are so arranged as to afford the student all the advantages of a real college training. The degree is Ph. B. in Commerce.

SHORT PROGRAM IN COMMERCE

This course is designed to meet the needs of those who have neither the preparation nor the time to follow out the subjects of the regular four-year program. All the practical topics are given. Only those whose maturity of mind will insure their profiting by this work are eligible to enter on the Short Program in Business Administration. Students under nineteen years of age must have completed the High School Course before they may take up the Short Program in Commerce.

FULL PROGRAM IN FOREIGN COMMERCE

The purpose of this course is to give students, along with a general cultural education, a technical knowledge of American and foreign markets and of approved methods of bringing the products of American industry to the attention of foreign customers. The course will be found of very special value to young men intending to enter the field of foreign commerce and particularly commerce with Latin America. No college course can take the place of actual office training, but students who have followed this program will need comparatively little of such experience to make them valuable assistants in the work of export management, and other things being equal, they will advance faster and further than those who have not enjoyed this particular training. The degree is Ph. B. in Foreign Commerce.

SHORT PROGRAM IN FOREIGN COMMERCE

Students who display special ability or who have had actual experience with foreign conditions, whether by residence or by training in American export offices, or who are unable on account of time limitations or other good reasons, to follow the long course, will be allowed to follow the Short Program in Foreign

Commerce. Students under nineteeen years of age must have completed the High School course before they may take up the Short Program in Foreign Commerce.

THE NOTRE DAME CHAMBER OF COMMERCE

A student Chamber of Commerce has been organized at the University for the double purpose of acquainting the students with the work undertaken by the various commercial organizations familiar to business men, and of giving practical application by a study of problems to the theoretical work of the classroom. The work consists of reports and discussions by students on subjects assigned, and lectures by business men on their specialties. The reports assigned take into account the previous business experience of the student, his prospective work, and the territory with which he is most familiar. The present membership of the Notre Dame Chamber of Commerce represents the following sections: Indiana, New York, Mississippi, Missouri, Kentucky, Illinois, Michigan, Massachusetts, Ohio, Oklahoma, Iowa, Arizona, Texas, Wisconsin, Kansas, California, Oregon, Nebraska, Virginia, West Virginia, Delaware, and New Jersey in the United States, and China, Turkey, Italy, France, England, Germany, Mexico, Honduras, Columbia, Panama, Peru, Chile, Porto Rico, Argentine, Uruguay and Brazil.

It can be readily seen that the interchange of ideas and experiences gathered in such widely separated regions is of the highest practical benefit. The work of the Chamber of Commerce is required during the four years of the course. In order to accomodate the work to the varying needs and development of the students, weekly meetings are held in four separate sections.

DEPARTMENT OF MUSIC

The study of music is an essential part of a liberal education. If we are to make music a part of our national life, we must develop audiences as well as performers. We must create an appreciation on the part of the hearer, as well as develop the artistic sense and technical skill of the musician.

The College of Music offers two courses: a professional music course, leading to the degree of Bachelor of Music ,and a musical culture course.

The College of music has its quarters in Washington Hall. This hall is splendidly equipped with studios for the faculty and twenty practice rooms; a good piano in each room. Besides a large organ, in the church, there is a pedal piano for the use of organ students. The band and lecture rooms are used for rehearsals and class work. The beautiful auditorium where lectures and recitals are given, seats 1200. In the library the students will find the most important books on music and aesthetics.

ARTISTIC ATMOSPHERE

Everything is done to broaden the student by developing a musical atmosphere. Recitals are given by the best concert companies, Artists are engaged for individual recital work. There are musical organizations: Male Chorus, Glee Club, Band, Orchestra, Mandolin and Banjo Clubs open to all students, provided they can pass certain qualifications required by the directors.

The Musical Art Society is a male chorus organized for the purpose of studying part songs and larger choral work. Membership in this organization is open to the whole University. Credit will be given students admitted to the Musical Art societies, University Band and Orchestra.

COMMUNITY SINGING

Music should be a part of our national as well as community life; community singing will be held under the direction of the head of the Department.

PROFESSIONAL MUSIC COURSE

Leading to the Degree of Bachelor of Music.

This course is outlined with the idea of giving students the breadth of knowledge necessary to be a force in the development of music in a community, as a lecturer, teacher, conductor or as a director of music in some school. In addition to the regular courses in music, the student will have to take work that will insure a broad cultural training—English, history, politics, philosophy, language. The completion of a high school course is required for entrance.

If necessary the student may be required to take up preparatory work in music, before taking up the regular courses.

There can be no absolute time limit set for practice as advancement depends to a very great extent on talent and application. In order to meet this condition, the courses outlined may be changed according to the individual needs of the pupil.

Students taking up this course must specialize in the study of some instrument or voice culture the required number of years. This specialization will serve as a foundation for a professional career. The student must have a technical knowledge of instruments other than the one in which he is specializing.

The study of theory, harmony, counterpoint, form and composition are required of all. Without them there can be no breadth of musicianship. As ensemble playing is a very important work, students will be given an opportunity to study together various piano and violin sonatas, quartettes and other combinations.

All students must attend the classes in the history of music. This work will consist of a critical and historical study as well as the musical analysis of the great musical works of the various periods.

Senior year students are required to attend lectures on sound and music.

All students must play or sing in recitals when requested.

All students are expected to join the Notre Dame Male Chorus, Musical Arts Society, provided they have the proper qualifications, a condition to be decided upon by the director.

Students of wind and brass instruments are expected to join the University Band.

Candidates for the degree of Bachelor of Music are required to give a recital and submit a group of small works for some instrument, or songs, and a work in larger form, or write a thesis upon a musical subject.

MUSICAL CULTURE COURSE

To obtain the degree of Bachelor of Music the candidate must have studied music in the University for one complete year. He must have a thorough theoretical knowledge of four specified instruments and a practical mastery of one of them. He shall pass a written examination in harmony, counter point and composition, and he must submit to the examiner two original compositions: (a) a fugue for full orchestra, or for four voices, with independent orchestral accompaniment: (b) a composition in the free form (sonata or rondo) for pianoforte, or a trio (pianoforte, violin and violincello.)

This course is open to all students of the University. The musical culture course is outlined with the idea of giving the students an opportunity to acquire a deeper musical enjoyment, through a more intimate understanding of the subject. The appreciation thus acquired will add much to the development of musical audiences,— a real need if we wish to make the art a part of our national life.

To make this course yield most the student ought to study some instrument, the piano preferably. This does not mean that he must have a great talent for piano-playing; by using the piano he will become acquainted with all phases of musical literature. An elementary course in theory and harmony is given to acquaint the student with the inner purposes of the technical elements of composition and to develop a keen sensitiveness and an intelligent understanding of the beauties of rhythm, melody, and harmony.

The classes in history of music and musical appreciation are intended not only for the study of the historical development of the art, but for the critical study of the classic, romantic or modern schools of composition, symphonic, operatic and choral literature, and other phases of musical development.

All musical culture students must join the Notre Dame Male Chorus, provided they have the proper qualifications of voice.

These studies may be taken as electives for which regular credits will be given.

TEACHER'S CERTIFICATE

Students, who do not wish to qualify for the bachelor's degree may specialize in piano, violin, organ, or voice. After completing the stipulated course as outlined for the instrument and two years of elementary and advanced harmony, a teacher's certificate will be granted by the college of music.

All practice is supervised. Students may specialize in any instrument. In case any other is selected it is taken instead of the piano, then other instruments are selected for the minor work.

DEPARTMENT OF LIBRARY SCIENCE

The work of the librarian is now regarded by everyone as a distinct profession and the training required for librarianship is considered just as necessary as the preliminary training for any profession. The best qualification for library service is a thorough knowledge of its technic, combined with a broad knowledge of men and books, called culture. The particular courses offered by the School of Library Science give the student a full acquaintance with the different branches of library economy, bibliography, and administration and their practical application in a modern library. In addition, the full prescribed courses of English, history and philosophy and two years of the social sciences offered by the Departments of History and Economics represent the liberal educational standard set for the degree.

Two years of college work are required for admission to the School of Library Science. Students must have a reading knowledge of French, German, and Spanish. The degree of Bachelor of Library Science is offered for the regular four year program of studies. A certificate is given to those who complete the two year outline of work.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF ARTS

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Latin	4	1	Latin	4	1
Greek	4	1	Greek	4	1
English	4	1	English	4	1
History	4	1	History	4	2
Biology	4	1,3	Physiology	4	1
Elocution	1	3	Elocution	1	4

SOPHOMORE YEAR

Latin	4	2	Latin	4	2
Greek	4	2	Greek	4	2
Philosophy	4	1	Philosophy	4	2
English	2	2	English	2	3
English	2	4	English	2	4
History	4	3	History	4	4
Elocution	1	8	Elocution	1	8

JUNIOR YEAR

Latin	3	3	Latin	3	3
Greek or Elec.	2	3	Greek or Elec.	2	3
Philosophy	4	3	Philosophy	4	4,5
English	3	5	English	3	6
Economics	4	1	Economics	4	1
Elective	4		Politics	4	2

SENIOR YEAR

Latin or Elec.	3	4	Latin or Elec.	3	4
Greek or Elec.	2	4	Greek or Elec.	2	4
English	3	7,8	English	3	8,9
Philosophy	5	6,7	Philosophy	4	7
Philosophy	2	8	Philosophy	2	8
Elective	3		Thesis	2	

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF LETTERS

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English	4	1	English	4	1
History	4	1	History	4	2
Biology	4	1,3	Physiology	4	1
Elocution	1	3	Elocution	1	4
Language*	4		Language*	4	2
Elective	4		Elective	4	

SOPHOMORE YEAR

English	2	2	English	2	3
English	2	4	English	2	4
Philosophy	4	1	Philosophy	4	2
History	4	3	History	4	4
Elocution	1	8	Elocution	1	8
Language*	4		Language*	4	
Elective	4		Elective	4	

JUNIOR YEAR

English	3	5	English	3	6
Philosophy	4	3	Philosophy	4	4,5
History	3	6a	History	3	6a
Economics	4	1	Economics	4	1
Elective	4		History	4	10

SENIOR YEAR

English	3	7,8	English	3	8,9
Philosophy	4	6,7	Philosophy	4	7
Philosophy	2	8	Philosophy	2	8
Politics	4	2	Elective	8	
Elective	4		Thesis		

*Latin, French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
History	4	1	History	4	2
English	4	1	English	4	1
Economics	4	16,17	Politics	4	2
Biology	4	1.3	Physiology	4	1
Elocution	1	3	Elocution	1	4
Language*	4		Language*	4	

SOPHOMORE YEAR

History	4	3	History	4	4
Economics	4	1	Economics	4	1
Philosophy	4	1	Philosophy	4	2
English	2	2	English	2	2
English	2	4	English	2	4
Elocution	1	8	Elocution	1	8
Language*	4		Language*	4	

JUNIOR YEAR

English	3	5	English	3	6
Philosophy	4	3	Philosophy	4	4,5
History	4	5	History	4	10
Politics	3	1	Economics	4	5
Elec. (Econ.)	4		Elective (Pol.)	4	

SENIOR YEAR

History	3	6a	History	3	6a
Philosophy	4	6,7	Philosophy	4	7
Philosophy	2	8	Philosophy	2	8
English	3	7,8	English	3	8,9
Sociology	3	1	Sociology	4	2 or 3
Elective	3		Thesis	2	

*Latin, French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY IN JOURNALISM

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Journalism	3	1a,1b	Journalism	3	2a,2b
English	4	1	English	4	1
History	4	1	History	4	2
Biology	4	1,3	Physiology	4	1
Elocution	1	3	Elocution	1	4
Language*	4		Language*	4	

SOPHOMORE YEAR

Journalism	3	3a,3b	Journalism	3	4a,4b
English	2	2	English	2	2
English	2	4	English	2	4
Economics	4	1	Economics	4	1
Philosophy	4	1	Philosophy	4	2
Elocution	1	8	Elocution	1	8
Language*	4		Language*	4	

JUNIOR YEAR

Journalism	3	6	Journalism	3	6
Journalism	1	5	Journalism	1	5
English	3	5	English	3	6
Politics	3	1	Politics	2	6
Philosophy	4	3	Philosophy	4	4,5
History	3	6a	History	3	6a
Economics	4	9	History	4	10

SENIOR YEAR

Journalism	4	7a,7b	Journalism	4	8a,8b
English	3	7,8	English	3	8,9
Philosophy	4	6,7	Philosophy	4	7
Philosophy	3	8	Philosophy	2	8
Sociology	3	1	Elective	2	
			Thesis	2	

*Latin, French, German or Spanish.

Students who have completed not more than two years in the A. B., Litt. B., or Ph. B., course may enter the course leading to a degree in Journalism without sacrifice of standing, and conditioned only to make up the work missed in the subjects of journalism proper.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY IN COMMERCE

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English	4	1	English	4	1
Economics	4	16,17	Politics	4	2
History	4	3	History	4	4
Economics	4	9	Economics	3	13
Elocution	1	33	Economics	2	14
Cham. of Com.		24	Elocution	1	4
Language*	4		Cham. of Com.		24
			Language*	4	
SOPHOMORE YEAR					
English	2	2	English	2	3
English	2	4	English	2	4
Economics	4	1	Economics	4	1
Economics	2	3	History	4	3
History	4	5	Accounting	4	2
Accounting	4	1	Cham. of Com.		24
Cham. of Com.		24	Language*	4	
Language*	4				
JUNIOR YEAR					
Economics (Advertising)	3	21	Economics (Advertising)	3	21
Philosophy	4	10	Philosophy	4	10
History	3	6a	History	3	6a
Economics	2	18	Economics	2	19
Economics	4	4	Economics	2	20
Cham. of Com.		24	History	4	10
Elective	4		Cham. of Com.		24
SENIOR YEAR					
English	4	10	English	4	10
Sociology	3	1	Economics	2	7
Economics	5	23	Economics	3	8
(Contracts)			Economics	4	5
Economics	4	10	Politics	2	5
Cham. of Com.		24	Cham: of Com.		24
Elective	2		Elective	2	
			Thesis		

Summer Work.—Two months of actual experience in office or factory work is required for graduation in both commerce courses. It is recommended that the summer between the Junior and Senior years be devoted to this work. A certificate attesting this experience must be presented by the candidate for a degree.

*Latin, French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY IN FOREIGN COMMERCE

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English	4	1	English	4	1
Economics	4	16,17	Politics	4	2
History	4	3	History	4	4
Economics	4	9	Economics	3	13
Elocution	1	3	Economics	2	14
Cham. of Com.		24	Elocution	1	3
Language*	4		Cham. of Com.		23
			Language*	4	

SOPHOMORE YEAR

English	4	2,4	English	4	3,4
Economics	2	3	Economics	2	20
History	3	6a	History	3	6a
Economics	4	1	Economics	4	1
Accounting	4	1	Accounting	4	2
Cham. of Com.		24	Cham. of Com.		24
Language*	4		Language*	4	

JUNIOR YEAR

Economics (Advertising)	3	21	Economics (Advertising)	3	21
Economics	4	15	Economics	4	4
History	4	10	Economics	4	15
Economics (Contracts)	5	24	History	4	10
Cham. of Com.		24	Cham. of Com.		24
Language*	4		Language*	4	

SENIOR YEAR

English	4	10	English	4	10
Economics	4	10	Philosophy	4	10
Philosophy	4	10	Economics	4	8
Economics	2	22	Economics	2	22
Cham. of Com.		24	Economics	4	5
Elective	4		Cham. of Com.		24
			Thesis		

*Two years of Spanish required before Junior year. If this is presented at entrance, French, German or Portuguese may be substituted.

SHORT PROGRAM IN COMMERCE

FIRST YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English	4	1	English	4	1
Accounting	5	1	Accounting	5	2
Economics	4	9	Economics	3	13
Economics	4	6	Economics	2	14
Cham. of Com.		24	History	4	7
Language*	4		Cham. of Com.		24
			Language*	4	

SECOND YEAR

English	4	10	English	4	10
Economics	4	10	Economics	3	8
Accounting	5	3	Accounting	5	4
Economics (Contracts)	3	23	Economics	2	7
			Elective	4	
Cham. of Com.		24	Cham. of Com.		24
Language*	4		Language*	4	

*Latin, French, German or Spanish.

SHORT PROGRAM IN FOREIGN COMMERCE

FIRST YEAR

English	4	1	English	4	1
Economics	4	9	Economics	3	13
Economics	4	6	Economics	2	7
Elective	5		Economics	2	14
Cham. of Com.		24	History	4	7
Language*	4		Cham. of Com.		24
			Language*	4	

SECOND YEAR

English	4	10	English	4	10
Economics	4	15	Economics	4	15
Accounting	5	1	Accounting	5	1
Economics (Contracts)	5	23	Elective	4	
			Cham. of Com.		24
Cham. of Com.		24	Language*	4	
Language*	4				

*Two years of Spanish. If this is presented on entrance French, German or Portuguese may be substituted.

PROGRAM IN ENGINEERING ADMINISTRATION

This is a one-year course intended for graduates of an engineering course—Civil, Mechanical, Electrical, Mining, Chemical or Architectural. Its purpose is to acquaint the engineer with the fundamentals of business practice and give him a knowledge of the practical application of scientific management. The degree of Engineering Administrator is conferred. The studies prescribed may also be pursued during four sessions of the Notre Dame Summer School.

STUDIES PRESCRIBED FOR THE DEGREE OF ENGINEERING ADMINISTRATOR

(This Course Presupposes a Degree of Engineering.)

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English	4	10	English	4	10
Accounting	4	1	Accounting	4	2
Contr'ts Econ.	5	23	Bus. Law	5	9
Economics	5	25	Economics	4	6
Transportation	2	7	Economics	4	5
Cham. of Com.			Cham. of Com.		

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF MUSIC

Specializing in Piano.

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Piano: Lesson	1	1	Piano: Lesson	1	1
Practice	14		Practice	14	
Harmony	1	1	Harmony	1	1
Voice: Lesson	½	1	Voice: Lesson	½	
Practice	3		Practice	3	
English	4	1	English	4	1
History	4	3	History	4	4
Language*	4		Language*	4	
SOPHOMORE YEAR					
Piano: Lesson	1	2	Piano: Lesson	1	2
Practice	13		Practice	13	
Harmony	2	2	Harmony	2	2
History of Music	2	6	History of Music	2	6
Violin: Lesson	½		Violin: Lesson	½	
Practice	3		Practice	3	
English	4	2,4	English	4	3,4
History of Art	2	3a	History of Art	2	3b
Language*	4		Language*	4	
JUNIOR YEAR					
Piano: Lesson	1	2	Piano: Lesson	1	2
Practice	16		Practice	16	
Counterpoint and Fugue	1	3	Counterpoint and Fugue	1	3
Form, Composition	1	4	Form, Composition	1	4
History of Music	2	7	History of Music	2	7
Aesthetics	1	8	Aesthetics	1	8
Catholic Church Music	3	10	Catholic Church Music	3	10
English	3	7,8	English	3	8,9
Politics	4	2	Economics	4	6
SENIOR YEAR					
Piano: Lesson	1	3	Piano: Lesson	1	3
Practice	10		Practice	10	4
Composition	1	4	Composition	1	4
Instrumentat'n	1	5	Instrumentat'n	1	5
Choral Conducting	1	12	Choral Conducting	1	12
Catholic Church Music	2	11	Catholic Church Music	2	11
Pipe Organ			Pipe Organ		
Lesson	1		Lesson	1	
Practice	2		Practice	2	
Aesthetics	1	9	Aesthetics	1	9
Philosophy	4	10	Philosophy	4	10

*Latin. French, German or Italian. The student should have a reading knowledge of French, German, Italian, and should be fairly proficient in one of these languages.

†Students may specialize in other instruments.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF LIBRARY SCIENCE

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
History	4	1	History	4	2
English	4	1	English	4	1
Economics	4	16,17	Politics	4	2
Biology	4	1	Physiology	4	1
Elocution	1	3	Elocution	1	4
Language*	4		Language*	4	

SOPHOMORE YEAR

History	4	3	History	4	4
Economics	4	1	Economics	4	1
Philosophy	4	1	Philosophy	4	2
English	2	2	English	2	3
English	2	4	English	2	4
Elocution	1	4	Elocution	1	8
Language*	4		Language*	4	

JUNIOR YEAR

English	3	5	English	3	6
Philosophy	4	3	Philosophy	4	4,5
History	3	5	History	3	5
Library Econ.	8	1-4	Library Econ	6	2,4,7
Lib. Admin.	2	4	Bibliography	2	5
Lib. Economy Practice	2		Lib. Economy Practice	3	

SENIOR YEAR

History	3	6a	History	3	6a
Philosophy	5	6,7	Philosophy	5	7
Philosophy	2	8	Philosophy	2	8
English	3	7,8	English	3	8,9
Lib. Admin.	1	1	Lib. Admin.	1	2,3
Bibliography	2	1	Bibliography	2	2-4
Lib. Economy	4	8,9	Lib. Economy	4	8-9
Lib. Economy			Practice	2	
Practice	2		Lib. Economy		

*Latin, French, German, Italian or Spanish.

College of Science

Department of Zoology

Department of Botany

Department of Chemistry

Department of Pharmacy

Department of Agriculture

THE COLLEGE OF SCIENCE

The College of Science was established as a distinct department of the University in 1865. The curriculum of the student was largely elective till 1867 when there was formed the group of prescribed courses now known as the Program of General Science. Fourteen programs are now offered to undergraduate students. The degrees under charge of the Faculty in this college are the ordinary degrees of Bachelor of Science in Botany, Bachelor of Science in Zoology, Bachelor of Science in Chemistry, Bachelor of Science in Pharmacy, Graduate in Pharmacy and Pharmaceutical Chemist, Bachelor of Science in Agriculture. The Master's degree and the Doctor's degree are conferred under the usual conditions.

THE DEPARTMENT OF ZOOLOGY

The program in Zoology has been designed for students who wish to devote their time largely to biological pursuits, either as an immediate preparation for the study of medicine or veterinary science, or with a view of teaching or otherwise engaging in biological research. The students in this program are required to prepare an essay during the first term of the Junior year on some subject pertaining to biology.

Students not preparing themselves for the medical profession may substitute for the advanced courses in anatomy and physiology equivalents from either mathematics, physics, or English literature.

PRE-MEDICAL

For those students who intend to study medicine and who do not wish to spend the time in preparation necessary to receive a degree, the pre-medical program has been arranged. The first two years of the Zoology program will meet their needs. It consists of all the necessary work for entrance to any medical school that does not require a bachelor's degree for matriculation.

The department of Zoology occupies the second floor of Science Hall, an consists of four large lecture rooms and laboratories well ventilated and lighted. There are also private laboratories set apart for graduate students. The lecture rooms are furnished with charts and models necessary in teaching the different courses. The arrangement of windows is such that the room can be easily darkened so that stereopticon and lantern slides on the subjects of botany, zoology and physiology may be used. The laboratories are equipped with compound and dissecting microscopes. In each room there is a library of works of reference pertaining to biological subjects. The general laboratory of microscopy, histology, and embryology is supplied with compound miscroscopes and the equipment indispensable in these courses. The zoological collection fills sixteen large cases and represents typical forms of all the orders and genera of vertebrate and invertebrate animals.

For work in anatomy, besides a large collection of charts, there are anatomical models of all the parts of the human body. These can be taken apart for close study. Besides there are several mounted and unmounted human skeletons. Students pursuing courses in human anatomy at the University study under a practicing surgeon and have the privilege of attending surgical clinics in St. Joseph Hospital of South Bend.

The bacteriological laboratory is completely equipped with compound microscopes, incubators, sterilizers, and all the improved apparatus employed in thorough and careful work in bacteriology. Apart from the others is a laboratory of photo-micrography which contains a perfect photo-micrographic instrument for experimentation, photographing microscopic objects, making lantern slides, etc. A large and fully equipped dark room adjoins the laboratory.

DEPARTMENT OF BOTANY

The department of Botany occupies the northwest end of Science Hall. It is well lighted and particularly well adapted to microscopical and histological work. The department is supplied with the usual requisites of a working laboratory such as compound microscopes and accompaniments for each student, the utensils and apparatus necessary for embedding by the paraffin, celoiden, soap methods, and mounting of preparations by the balsam, Venetian turpentine and glycerine methods. There are besides, microtomes, camera lucida, micrometers and aquaria for plant cultures so that the typical algae and fungi may be had alive for laboratory use in all stages of development throughout the year. Special devices for the regulation and modifying of artificial light are at hand enabling the student to work on dark as well as clear days. Advanced students are supplied with special microscopes with Abbe condenser and oil immersion lenses. The laboratory is well stocked with histological material, and neary all the types of common plant families of the phanerogamia and cryptogamia are preserved after proper fixing. The material for demonstration of the fresh water algae is particularly good and abundant. The supply of material in Venetian turpentine and glycerine is valuable, as it supplies permanent mounts in a few minutes' work. There are also hundreds of specimens of rare and common types in paraffin. A herbarium containing over 15,000 species of flowering plants, and about five thousand cryptogam, supplies the needs of the classes in systematic botany. The collection includes plants from all parts of the United States, Europe and Canada,—Africa, South America, the Pacific coast and the Southern States are especially well represented. Besides these there is a large collection of fungi, marine algae, mosses, a large collection of several hundred species of myxomycetes from the Eastern and Central States, also nearly a thousand specimens of lichens from all parts of the United States and Europe. The herbarium is well stocked with specimens of the the local flora, and special facilities are on hand for the study of the compositae. In the museum are found specimens of American tropical woods and fruits. The laboratory for more advanced work accomodates about twenty-five students. It is supplied with working tables covered with plate glass, and each place is supplied with lock and key. The lecture rooms in botany have a seating capacity of seventy-five to one-hundred. The total seating capacity of laboratories is about forty students.

The botanical library connected with the department and conveniently situated in the same building contains over 3,000 volumes mostly the classics of the science, some not to be duplicated anywhere in the country. These original editions of the great makers of botany, some, autograph copies, range from the year 1492 to the present time; such works as those of Linnaeus, Tournefort, Caesalpino, Haller, Jussieu, De-Candolle, Ray, Morison, Parkinson, Lobelius, Dodonaeus, Ruellius, Fuchs, Tragus, Brunfels, Matthioli, Marcellus Vergilius, Hermolaus Barbarus, Camerarius, Dillenius, the Bauhins, Gregor Mendel, Persoon, Leeuwenhoeck Malpighi, Nehemiah Grew, Adanson, Ventenat, Willdenow, and hundreds of others. Most of these are the rare first editions.

Special effort has been made to obtain the reference works and original editions for investigation and research by collecting epoch making works such as Mendel's Linnaean and Fournefortian works. The literature for study of systematic botany is notably valuable.

The University Herbarium containing about ten thousand mounted plants with many types, as also a private herbarium of as many specimens, is also kept here. The library of botany, mostly classics of the science, is open to the students. About two hundred and fifty current magazines come to the department and are on file in the University library.

There are also the usual magazines with back numbers all relating to botany. These conveniences for botanical research leading to higher degrees are especially notable, and offer to the students of the science of systematic botany advantages for research.

THE EDWARD LEE GREENE HERBARIUM AND BOTANICAL LIBRARY

This Herbarium contains over one hundred thousand specimens, many thousands of which are types of plants first discovered and described by Dr. Greene during a half century of arduous botanical activity. It is one of the most valuable herbaria in America. The Library contains four thousand choice and rare volumes of botanical works, including many first editions and books now out of print.

These works and plants may be studied by post-graduate students only.

THE DEPARTMENT OF CHEMISTRY

This program is intended for students who wish to obtain such a knowledge of chemistry as may fit them for professional work either in the laboratory or the class-room. Though fixed to a great extent, the schedule of work admits in the Junior and Senior year of some elective study.

Every candidate for a degree in Chemistry is required to write an essay in the Junior year on some subject connected with Chemistry and must submit, at least four weeks before the final examination, a written thesis on work covered in his Senior year. This thesis must contain at least three thousand words.

The degree of Bachelor of Science in Chemistry is given to those students who have written an approved thesis and have passed a satisfactory examination.

In the schedule, an hour means two sixty minute periods of laboratory work or one of lecture or recitation.

Chemistry Hall is situated in the southeastern part of the grounds and is a large three story structure devoted to chemistry, pharmacy, mining and agricultural chemistry. It is built in the shape of a "T" with the larger laboratories and stock rooms in the rear third floor. This arrangement helps in the ventilation of the entire building besides making these laboratories more compact. In the front of the same floor are the organic and pharmacy laboratories together with the museum and library. The second floor is given over to two large class rooms and one or two smaller ones together with the laboratories for quantitative and physical and electro chemistry. The rest of the space is taken up with research and private laboratories. On the first floor are situated the laboratories for mining and agriculture together with research and class rooms for these departments. In the rear is a large reserve stock room and a locker room for students together with toilets and room for caretakers. All these laboratories are fitted up in the most approved modern style and have all the conveniences necessary for thorough and painstaking work. In the laboratories for General Chemistry each desk is fitted up with vents for taking off the noxious gases besides acting as ventilators for the rooms. There are a few side shelves as all the material used by each student is given to him in his locker so that he needs to move but little from his place in the laboratory. This conduces to more attention and a greater saving in material. The library contains besides books of reference the principal chemical journals and the museum is growing more and more by additions of minerals and chemicals designed as illustrations of substances and processes discussed in lectures.

THE LABORATORIES OF PHYSICS

The department of Physics occupies a suite of three rooms in the south end of the first floor of Science Hall and three laboratories in the basement. The lecture room will accommodate seventy-five students. For the work in mechanics there is the force table, inclined planes, Geneva cathetometer, capable of measuring to the one twenty-five thousandth of an inch, a large physical balance, standard kilogram, a standard metre, a dividing engine made by the Geneva society, an Atwood's machine, a compound pendulum, a break circuit recording chronograph, a powerful hydraulic press with attachements, rotary air pumps and receivers, a large clock with electrical contact pieces, several self-winding clocks, mercury barometers and two aneroid barometers.

For the work in acoustics there are a Mercadier radiophone, a set of Koenig resonators, a set of electrically operated tuning forks by Koenig, a Scott-Koenig phonautograph, an Edison phonograph of earliest type, several sets of vibrating rods, tubes, and bells, a large double siren, a set of very small tuning forks producing the highest audible sounds, a set of resonators mounted together with capsules of sensitive flames arranged for the analysis of complex sounds, a set of Koenig's movable tuning forks to draw compound curves on smoked glass, three sets of organ pipes. four sets of fine tuning forks, a set of apparatus for manometric observation of sound phenomena, a large tuning fork producing the lowest audible sound, an electric metronome, a set of mounted tuning forks carrying small mirrors arranged to perform Lissajou's experiment, producing complex curves.

For the work in light there are a complete set of apparatus by Soleil, Paris, for the measurement of the wave lengths of light by various interference methods, a set of polarization spring apparatus, sets of lenses and spherical mirrors, two heliostats, four spectroscopes, a polarization saccharimeter, three projecting lanterns for gas or electric light and 3,000 slides, a set of large Nicol's prisms mounted, a large compound prism to form widely dispersed spectrum, two Rowland gratings 14,000 lines to the inch, a set of photographs of solar spectrum by Rowland, several cameras with lenses and attachements, a well-equipped darkroom for photographic work, and a photometric room. and equipment.

For work in heat there are Melloni's apparatus for measuring radiation, absorption and reflection of heat complete with a set of prepared substances, standard thermometers, air thermometers, a steam engine indicator, several calorimeters, apparatus for determining the coefficient of linear expansion using the optical lever method.

For work in electricity and magnetism there are an absolute electrometer, a Holtz machine and apparatus for illustrating static phenomena, four induction coils, six bridges of different types, several ammeters and volt-meter, one 2,000 lb. electro magnet, standard resistance coils, an historical set of motors showing evolution of the modern machine from the early forms of the reciprocating type, ten galvanometers of various types, a complete X-ray outfit, sets of apparatus for wireless telegraphy.

THE DEPARTMENT OF PHARMACY

There are three programs in Pharmacy: one of two years, leading to the degree, *Graduate in Pharmacy* (*Ph. G.*); and one of three years leading to the degree, *Pharmaceutical Chemist* (*Ph. C.*); and one of four years leading to the degree, *Bachelor of Science in Pharmacy* (*B. S. in Ph.*)

ADMISSION

Applicants for admission to the short program must be 17 years of age, and must pass an examination in the subjects required for the completion of the first two years of high school work. A certificate of work done equivalent to two years of high school will be accepted instead of an examination.

For admission to the three and four year programs, in addition to the age limit, the same conditions apply as for entrance to the Freshman year of any regular program in the College of Science. Evidence of this work may be shown by certificate of examination.

The School of Pharmacy holds membership in the American Conference of Pharmaceutical Faculties. The object of the Conference is to promote the interests of pharmaceutical education and all institutions holding membership in the same must maintain certain minimum requirements for entrance and graduation. Through the influence of this Conference higher standards of education have been adopted from time to time and the fact that several States by law or by board ruling recognize the standards of the Conference is evidence of this influence.

METHODS

The subjects studied in this department are intended to impart a thorough theoretical as well as practical knowledge of Pharmacy, the work commencing with the simplest process and gradually leading up to the most difficult and complicated.

Special attention is given to the little details, which are essential to success in any professional work and particularly so in Pharmacy. The student is carefully drilled in store etiquette, business hints, prescription work, and dispensing. Neatness and order in all the operations and extreme care in the manufacture of preparations are required throughout the courses.

Attention is given to Animal extracts, Serum-Therapy, Antitoxins, new Synthetic Remedies and Alkaloidal Medication.

THE LABORATORY OF PHARMACY

Each desk is supplied with all the apparatus necessary for ordinary work. Special apparatus is furnished as required.

The department contains a fully equipped Drug Store in which the student obtains practically the same experience that he would get in actual business. A second year student is placed in full charge. He is required to furnish supplies for the department, order material, write business letters, invoice stock, etc. Then at the end of a specified time he delivers the store in good order to his successor.

About 2,000 recent prescriptions written by physicians, and taken from the files of a drug store, and the same number of prescriptions, mostly, in the metric system, obtained from the San Pedro's Pharmacy in Consolacion del Sur, Cuba, constitute a very important part of the equipment. Under supervision of the instructor each student is required to read them and to compound those requiring special manipulation. The reading room is supplied with all the leading pharmaceutical journals and books of reference. The pharmacognosy room contains specimens of all the official and a great many unofficial drugs for study and identification.

THE DEPARTMENT OF AGRICULTURE

The four-year Course in Agriculture has been carefully planned to give the student a thorough scientific and practical knowledge of Agriculture. The first two years' of work are general, and yet, contain the required sciences necessary to establish a foundation for any line of agricultural activity in which the student may desire to specialize. At the beginning of the Junior year, each student will be given a chance to elect the course which he wishes to follow as a life work.

Courses are offered in Animal Husbandry, Dairying, Horticulture, Agronomy, Farm Mechanics, and combined courses in Domestic and Foreign commerce. Heads of the various departments in which work is to be taken, should always be consulted before selecting a course. At the end of the Senior year, each student will present a thesis, which shall embody the results of some definite research work carried on during his Senior year.

WINTER COURSE

A short course covering a period of two years, at the completion of which a certificate of proficiency is given the student is also offered. This consists of the pure agricultural subjects found in the Freshman and Sophomore years, of the long course, and is especially intended for students who cannot leave their work at home until after the summer rush and who must return early in the spring. October 15th is set for the opening and March 15th for the closing of the Winter Course. This course should prove an attractive one for students living in the vicinity of the University. The requirements for entrance are that the student be 17 years of age and has completed at least his elementary education.

THE LABORATORIES OF AGRICULTURE

The Department of Farm Mechanics. The Farm Mechanics laboratory is a two-story building, 45-110 feet. It is equipped with line shafting and power for testing and operating the various machines.

The first floor contains the tool-room, the Gas Engine Laboratory, the department of forging and the repair shop. Ample space is also provided on this floor for the tractors and the operation of the heavy farm machines. The second floor is equipped with all the light machines and the Cement Laboratory.

The Farm Mechanics Laboratory is equipped with all the modern farm machines, such as: corn and grain binders, grain and grass seeders, corn planters, potato planters, mowers, rakes, lime spreaders, manure spreaders, sprayers, cultivators, gang plows, hay-loaders, thrashing machines, wagons, feed-grinders, ensilage cutters, etc.

The Gas Engine Laboratory is equipped with every type of internal combustion engine. The amount of power available from the various engines combined is over two hundred horse power. Various apparatus is used for testing the power of engines. The laboratory is equipped with various spraying outfits, pumps and lighting systems.

The Cement Laboratory is equipped with a power concrete mixer. There are moulds for making drain tile, sewer pipe, building posts, columns, and ornamental work. Different kinds of apparatus are used for testing compression and the tension strength of concrete.

The forge shop is equipped with the latest type of forges. A forge and set of tools are provided for each student. The carpenter shop is equipped with modern work benches and a complete set of tools for each student. The tool room has a large assortment of miscellaneous tools. The shop is also provided with an electric motor, a power cross-cut and rip saw, hand saw, jig saw, a 24 inch planer, a joiner, nine spud lathes, energy grinder, grinding stone and boring machine.

The Department of Agronomy. The Field Crops Laboratory is equipped with running water, waste facilities, gas, and light. In addition to these facilities, there is an abundance of class demonstrative material, germinating ovens, seed testers, microscopes, and lenses.

A very complete library of agronomic subjects is at the disposal of the students.

In addition to the class room and laboratory facilities, the department has the privilege of studying the field work on the Notre Dame farm. This offers opportunities for students to study actual farming operations under various conditions, and gives means for carrying on demonstrations for their instruction also furnishes abundant class and laboratory material for grain judging and study of varieties.

The Soil Laboratory equipment comprises microscopes, sampling augers, tubes, and carriers; balances, ovens, soil thermometers, packers, cylinders, moisture absorption box with trays; percolation, capillary and evaporation apparatus; sieves; shakers, etc.

The equipment is of the best type and fully adequate for giving thorough courses in soils. The College farm is used for the practical work in drainage, fertilization, and study of soil types.

The Department of Horticulture. In addition to the lecture room and laboratories for indoor work, ample provision is made for practical work outdoors. A propagating house and nursery on the farm are used in carrying on stratification, layering, cuttage budding grafting and other methods of plant propagation.

Fruit trees of different kinds and ages are growing in the orchard. The department is also permitted to work in the University vegetable garden, vineyards, small fruit gardens, and the Notre Dame Campus which is one of the finest in America. The Greenhouse contains a varied collection of the leading bedding and decorative plants and affords facilities for practical instruction in forcing of vegetables and cut flowers and greenhouse management. Hot-beds and cold frames of brick construction are also at hand. The department library embracing many standard works, magazines, bulletins, and other equipment is accessible to advanced students. Fruit-growing, when done in a scientific way, is extremely profitable and presents an inviting field for the trained Horticulturist.

The Department of Dairying. For the Dairy work the College has over two hundred of the best Holstein cows to be found in Indiana.

The large new dairy barn of modern sanitary construction, provided with concrete floors and silos, steel stanchions and fittings, for housing the herd of high-grade and registered cows.

The large new and well-lighted laboratory, is equipped with all the leading makes of hand and motor power cream separators, churns, butter workers; milk cooler, gravity creamers, vats for cream ripening and cheese making; scales, wash sinks, sterilizer, and cans, buckets, bottles and brushes necessary for instruction.

The milk testing laboratory contains testers of different sizes, cream scales, lacometers, acidimeters, butter-moisture tests and various other new apparatus.

Students are provided herd books and taught how to trace pedigrees as well as the use of forms for tabulating and keeping them. The dairy cows on the farm are used for stock judging, breeding and feeding experiments.

The Department of Poultry. The poultry plant contains pens suited to poultry keeping in Indiana. Incubators, brooders, and other equipment are supplied. The laboratories are furnished complete with poultry appliances.

Animal Husbandry. The animal husbandry farm contains about 3000 acres. Upon this farm is a model dairy barn, which accommodates over two hundred cows. The one hundred and twenty hogs are kept in our piggery which is said to be one of the most modern in the country. The two large horse barns are very complete in every detail. In the beef cattle barn and feed lots have been fed some of the prize winning cattle at the International Fat Stock Show. The students visit the barns with the instructors and are thus afforded an opportunity to study the various breeds of live stock and do stock judging work. In addition to the pure breeds of stock upon the Notre Dame Farm, there are always grade and scrub animals which are used in our class work.

Percheron horses of high quality are being main tained on the University Farm. It is believed that they are well suited to the farm needs throughout this section of the United States. Mules of different types are also kept and are used in stock judging. The equipment includes a five-ton Fairbank platform scale, tape lines, measuring standards, etc.

ENTRANCE SUBJECTS

Applicants who do not present properly attested certificates for preparatory work must take entrance examinations in required and elective subjects.

English. Part of the examination time is given for answering questions upon the text-books and readings required in the regular preparatory courses in English; the remainder, for writing an essay.

Physical Geography. As given in *Tarr's* text-book or an equivalent treatise

Physiology. Martin's Human Body, or an equivalent treatise.

Zoology. Botany. Elementary.

Civil Government. The American Constitution; Federal and State Governments.

History. General outlines of Ancient, Medieval, and Modern History. American History.

Algebra. The whole subject as far as logarithms, as given in *Wentworth's College Algebra,* or an equivalent in the larger treatises of other authors.

Geometry. Plane and Solid, including the solution of simple original problems and numerical examples, as given in the works of *Wentworth, Chauvenet, Newcomb* or equivalent treatises by other authors.

Chemistry. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations. A course of at least fifty experiments in elementary chemistry actually performed by the pupil.

Physics. Elementary. The preparation in this subject should include a course of lectures, illustrated by experiments, and recitations from a text-book similar to *Carhart and Chute's* or *Gage's.* In both chemistry and physics the laboratory note-book must be presented.

German. A two year course in German is required. Ability to translate at sight, easy German into English and easy English into German, or

French. A two year course in French may be presented instead of German under the same conditions. Ability to translate readily, rather than an accurate grammatical knowledge, is expected. Spanish may also be offered as the modern language.

Latin. Grammar, complete; *Caesar,* four books of the Gallic War; translation from English into Latin based on the text of *Caesar.*

Subjects required for entrance to Freshman year:

English	4	French, German, Spanish, Latin	2
Science (Chemistry and Physics)	2	History	1
Mathematics	3	Elective	3

LABORATORY FEES FOR GENERAL SCIENCE

Assaying 2	$10.00
Bacteriological Laboratory—*Bacteriology*	10.00
Biological Laboratory—*Zoology* 2, 3, *each*	5.00
Botanical Laboratory—*Botany* 2, 4, *each*	5.00
Chemistry 1, 7, each	6.50
Chemistry 3, 6, 8, 9 (b), 11 (b), 11 (c), 13 (b), each	12.50
Chemistry 4, 5, each	25.00
Mineralogy 2	6.00
Pharmaceutical Laboratory 2, 4, 6, 7, each	20.00
Physics, 1, 3, each	7.50
Toxicology 1	5.00

LABORATORY FEES FOR AGRICULTURE

Horticulture 1, 2, each	$ 5.00
Forage Crops	5.00
Grain Growing	5.00
Farm Mechanics	5.00
Agricultural Engineering	5.00
Soils, Soil Fertility, each	10.00
Entomology	5.00
Dairying	5.00

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Chemistry	4	2	Chemistry	4	3
Algebra	4	1	Anal. Geom.	5	2
English	4	1	English	4	1
Trigonometry	4	1	History	4	7
Language*	4		Language*	4	

SOPHOMORE YEAR

Chemistry	4	5	Chemistry	4	5
Calculus	3	4	Calculus	3	5
Physics	4	2	Physics	4	2
Physics	2	4	Physics	2	4
Chemistry	3	6a	Economics	4	6
Chemistry	3	6b	Chemistry	3	6a

JUNIOR YEAR

Chemistry	3	9a	Chemistry	3	9a
Chemistry	3	9b	Chemistry	3	9b
Mineralogy	2	2	Assaying	3	2
Chemistry	2	11a	Geology	3	1
Chemistry	1	11b	Chemistry	3	13a
Chemistry	1	11c	Chemistry	3	13b
Chemistry	4	8	Politics	4	2
Chemistry	3	12			

SENIOR YEAR

Chemistry	3	14	Chemistry	3	14
Philosophy	4	10	Philosophy	4	10
Scientific Readings in German and French	2		Scientific Readings in German and French	2	
Elective	10		Elective	5	
			Thesis	2	

*French or German.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN BOTANY

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Botany	3	1	Botany	3	1
Botany	2	2	Botany	2	2
Zoology	3	1	Zoology	3	2
Zoology	2	2	Zoology	2	2
Chemistry	3	2	Trigonometry	4	1
Chemistry	2	3	Chemistry	2	4
English	4	1	English	4	1
			Freehand Drawing	2	2

SOPHOMORE YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Botany	3	3	Botany	3	3
Botany	2½	4	Botany	2½	4
Physics	4	2	Physics	4	2
Physics	2	4	Physics	2	4
Chemistry	4	6a	Chemistry	4	6a
Chemistry	3	6b	Chemistry	3	6b
Language	4		Language	4	

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Botany	5		Botany	5	6
Bacteriology	4		Philosophy	5	1a,1b
Microscopy			Geology	3	1
Mineralogy	2		Philosophy	4	10
Philosophy	4				
Language	4		Language	4	

SENIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Botany History of	3		Botany Seminar	5	
Botany	5	6	Botany	5	6
Zoology	6	3	Zoology	6	3
Elective*	4		Elective*	4	
Thesis			Thesis		

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN ZOOLOGY

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English 1.	3	1	English	3	1
Chemistry	4	2	Chemistry	4	3
Botany	5	1	Botany	5	1
Trigonometry	4	1	Physiology	4	1a,1b
*Language	4		Language	4	
Drawing	2	1	Drawing	2	1

SOPHOMORE YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Chemistry	3	6a	Chemistry	3	6b
Chemistry	3	6c	Bacteriology	4	1
Zoology	5	1	Zoology	5	1
Physics	5	2,4	Physics	5	2,4
*Language	4		*Language	4	

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Philosophy	4	10	Philosophy	4	10
Chemistry	3	7a,7b	Chemistry	4	16
Materia Medica and Pharmacy	3	8a,1	Materia Medica and Pharmacy	3	Sa,1
Chemistry	4	5	Chemistry	4	5
History	4	7	Elective	2	

SENIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Zoology	8	3	Zoology	8	3
Bacteriology	4	2	Bacteriology	4	2
Mineralogy	2		Geology	3	
Elective	4		Elective	4	
			Thesis		

A reading knowledge of French or German and one year of Latin required for entrance.

*French, German or Latin.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACY

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Chemistry	5	2	Chemistry	4	4a
English	4	1	English	4	1
Botany	3	1	Botany	3	1
Botany	2	2	Botany	2	2
Microscopy		1	Physiology	4	1a,1b
Bacteriology	4	1	Language*	4	
Language*	4				

SOPHOMORE YEAR

Pharmacy	3	1	Pharmacy	3	1
Pharmacy	5	2	Pharmacy	5	3
Chemistry	4	4b	Physics	4	2
Physics	3	2	Physics	2	3
Physics	2	4	History	4	7
Phar. Arith.	3	9	Mat. Medica	1	8a

JUNIOR YEAR

Pharmacy	2	4	Pharmacy	2	4
Pharmacy	3	5	Pharmacy	5	6a
Chemistry	3	6a	Economics	4	6
Chemistry	3	6b	Phar. Latin	2	13
Pharmacy	1	9,11	Mat. Medica	2	8b
Pharmocog'y	2	10	Chemistry	3	6a
Minerology	2	2			
Mat. Medica	2	8b			

SENIOR YEAR

Pharmacy	6	6b	Pharmacy	5	7
Philosophy	4	10	Urine Anal.	1	7a
Politics	4	2	Toxicology	2	7b
Chemistry	3	10	Philosophy	4	10
Thesis			Elective	4	

*French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF GRADUATE IN PHARMACY

FIRST YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Pharmacy	3	1	Pharmacy	3	1
Pharmacy	5	2	Pharmacy	5	3
Chemistry	4	1a	Chemistry	4	4a
Chemistry	2	1b	Physiology	4	1a,1b
Microscopy and		1	Mat. Medica	2	8a
Bacteriology	4	1	Phar. Latin	2	13
Phar. Arith:	3	9			

SECOND YEAR

Pharmacy	2	4	Pharmacy	2	4
Pharmacy	4	4	Pharmacy	5	6a
Pharmacog'y	2	10	Mat. Media	2	8b
Chemistry	4	4b	Chemistry	3	6a
Mat. Medica	2	8b	Chemistry	3	6b
Chemistry	3	6a	Pharmacy	1	11,12
Botany	3	1	Botany	3	1
Botany	2	2	Botany	2	2

STUDIES PRESCRIBED FOR THE DEGREE OF PHARMACEUTICAL CHEMIST

FIRST YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Pharmacy	3	1	Pharmacy	3	1
Pharmacy	5	2	Pharmacy	5	3
Chemistry	5	2	Chemistry	4	4a
English	4	1	English	4	1
Bacteriology		1	Physiology	4	1a,1b
and Microscopy	4	1	Mat. Medica	1	8a

SECOND YEAR

Pharmacy	2	4	Pharmacy	2	4
Pharmacy	3	5	Pharmacy	5	6a
Chemistry	3	6a	Chemistry	3	6a
Chemistry	4	4b	Economics	5	6
Pharmacog'y	3	10	Pharmacy	1	11,12
Mat. Medica	2	8b	Phar. Latin	2	13
Mineralogy	2	2	Chemistry	3	6b
Phar. Arith.	3	9			

THIRD YEAR

Botany	3	1	Botany	3	1
Botany	2	2	Botany	2	2
Pharmacy	6	6	Pharmacy	5	7
Philosophy	4	10	Urine Anal.	1	7a
Toxicology	2	7b	Philosophy	4	10
Chemistry	3	10	Politics	4	2
			Thesis	2	

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Horticulture	3	1	Botany	5	1
English	4	1	Stock Judging	3	1
Field Crops	4	1	English	4	1
Farm Shop	2	1	Vegetable Gardening	3	5
Agricultural Drawing	2	1	Cement and Concrete	2	8
Chemistry	4	2	Chemistry	4	3

SOPHOMORE YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Soil	4	6	Soil Fertility	4	7
			Farm Dairying	4	1
Feeding of Animals	3	2	Grain Crop Production	3	2
Zoology	5	1	Physics	5	2
Physics	5	2	Farm Mechanics and Gas Engines	3	15
Farm Forage	4	5	Farm Poultry	2	11

SPECIALIZING IN AGRONOMY

JUNIOR YEAR

Bacteriology	4	1	Plant Pathology	4	3
Forage Crops	2	3	Farm Management	5	9
Seed Identification	3	4	Geology	5	1
Economics	4	6	Truck Farmi'g	3	3
Grain Judging	3	5	Advanc'd Grain Growing	4	5
Elective	4				

SENIOR YEAR

Agricultur'l Economics	4		Rural Sociol'y	3	
Philosophy	4	10	Cooperative Marketing	2	
Soil Manag'm't	4		Politics	4	2
Special Problems in Crop Prod'ct'n Crop Breeding Soil Fertility Soil Bacteriology and Agricultural Educ.	9		Crop Impr'm't	3	
			Special Problem in Crop Breeding, Soil Bacteriology, and Soil Fertility	3	7
			Thesis	2	

SPECIALIZING IN ANIMAL HUSBANDRY AND DAIRYING

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Bacteriology	4	1	Diseases of Farm Animals	5	10
Economics	5	6	Farm Management	5	9
History of Breeds	3	3	Live Stock Marketing	3	7
Pork Product'n	3	4	Sheep Raising	3	6
Advanc'd Stock Judging	3	5	Milk Production & Dairy Management	3	
Advanced Forage Crops	2	3	Advanc'd Grain Growing & Breeding	2	

SENIOR YEAR

Agricultural Economics	4		Rural Sociology	4	
Philosophy	4	10	Politics	4	2
Meats	2	8	Butter Making & Creamery Inspection	3	2
Advanc'd Stock Feeding	3	9	Stock Breeding	3	9
Special Problems in Pork Production, Stock Raising, Feeding or Dairying	8		Special Problems in Pork Production, Stock Raising and Dairying	8	
			Thesis		

SPECIALIZING IN HORTICULTURE

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Bacteriology	4	1	Plant Pathology	5	
Systematic Pomology	4	3	Farm Management	5	9
Vegetable Forcing	4	2	Truck Farming & Vegetable Gardening	5	1
Economics	5	6	Garden Flowers	2	1
Orchard Managem't	3	2	Plant Materials in Landscape	2	4
			Small Fruit	2	4

SENIOR YEAR

Agricultural Economics	4		Rural Sociol'gy	3	
Philosophy	4	10	Politics	4	2
Landscape Design	4	3	Marketing of Horticultur'l Products	3	5
Floriculture	4	1	Special Problems in Vegetable Gardening, Vegetable Forcing, Fruit Growing, Small Fruits, Landscape Gardening, or Floriculture	10	
Farm & City Forestry	2	4			
Horticultural Entomology	3				

SPECIALIZING IN FARM MECHANICS

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Agricultural Drawing	3	1	Agricultural Drawing & Design of Farm Structures	3	9
Farm Construction	4	7	Farm Structures	4	11
Agricultural Engineering	2	10	Farm Equipment	2	13
Concrete on the Farm	2	3	Surveying	2	12
Electives	10		Electives	10	

SENIOR YEAR

Farm Mechanics	2	14	Forging & Repair Work	4	18
Gas Engines & Tractors	2	15	Thesis	8	
Farm Blacksmith'g	4	16	Electives	10	
Farm Machinery	2	17			
Electives	10				

SPECIALIZING IN AGRICULTURE AND DOMESTIC COMMERCE

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Advanced Forage Crops	2	3	Farm Management	5	9
Adv. Stock Judging	3	5	Insurance	3	13
Accounting	4	1	Accounting	4	2
Economics	5	9	Transportation	2	
Money	2	3	Credit	2	19
& Banking	2	3	Advertising	3	6
Advertising	3	6	Chamber of Commerce		
Chamber of Commerce					

SENIOR YEAR

Agricultural Economics	4		Rural Sociology	3	
Philosophy	4	10	Politics	4	2
Business English	4	10	Business English	4	10
Contracts	5		Distribution of Wealth	4	5
Special Problems in Marketing Farm Products or in Transport'n	4		Chamber of Commerce		
Chamber of Commerce			Special Problems in Marketing Farm Products or in Transportation	6	

SPECIALIZING IN AGRICULTURE AND FOREIGN COMMERCE

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Advc'd Forage Crop	2	3	Farm Management	5	9
Advanc'd Stock Judging	3	5	Language	4	
Language	4		Commercial Geography	2	14
Contracts	5		Credit	2	19
Money	2	3	Foreign Exch.	2	20
& Banking	2	3	Ocean Transportation	4	22
Chamber of Commerce	1		Chamber of Commerce	1	

SENIOR YEAR

Agricultural Economics	4		Rural Sociol'gy	3	
Politics	4	2	Exporting	4	
Philosophy	4	10	Distribution of Wealth	4	5
Exporting	4		Language	4	
Language	4		Spec. Problems in Marketing Farm Prod'ts in Europe & Canada or Breeding Stock in So. America	6	
Chamber of Commerce			Chamber of Commerce		

College of Engineering

Department of Civil Engineering

Department of Mechanical Engineering

Department of Electrical Engineering

Department of Mining Engineering

Department of Chemical Engineering

Department of Industrial Engineering

THE COLLEGE OF ENGINEERING

In the industrial development of a country the engineer takes an important part. Many new industries are springing up, and the great activity in those already established throughout the world created a demand for the services of trained engineers.

The programs of studies in the six departments of engineering at Notre Dame are arranged to give a knowledge of the fundamental facts and theories that are applied in engineering work. Mathematics is foremost among these requirements. The natural sciences receive their share of attention, and due importance is given to language and subjects of general educational value in arranging the programs of studies.

Laboratory work and field work give a certain amount of practice in the application of the theory to actual physical conditions. These conditions are made to correspond as closely as possible to the real work of the engineer.

A student who has no liking for mathematics should not be encouraged to take up an engineering course. The successful engineer is one who thinks clearly and executes accurately. Clear thinking is necessary to master mathematical subjects and skill and accuracy are acquired by applying the results of mathematical calculations to particular practical cases in laboratory work.

Six regular programs of studies have been arranged: One leading to the degree of Civil Engineer, one to the degree of Mechanical Engineer, one to the degree of Electrical Engineer, one to the degree of Engineer of Mines, one to the degree of Chemical Engineer, and on to the degree of Industrial Engineer.

Special Short Courses in Electrical and Mechanical

Engineering are offered to accommodate those who wish to fit themselves for practical work in the shortest possible time.

The various laboratories are equipped with the most approved forms of instruments and appliances and considerable time is given to technical work. The equipment for each department will be found described and referred to on the succeeding pages of this bulletin.

In addition to the work in the laboratories and the power plants of the University, students are taken on inspection tours to the important engineering works in the neighborhood. Several of the largest manufacturing plants in the world are in South Bend or the vicinity.

In the schedules of studies one hour credit is given for each recitation or lecture which requires from one to two hours preparation. At least two hours actual time in laboratory work, shopwork or drawing is required for each hour on the schedule.

EXPENSES

In addition to the regular fee for matriculation, board, tuition, lodging, as given on page 35, the regular students in the Engineering Programs are required to pay laboratory fees to cover, in part, the cost of materials consumed and the deterioration of the apparatus used.

Assaying 3	$20.00
Chemistry 1	6.50
Chemistry 3, 6, 8, 11 (b), 11 (c), 14, 15, each	12.50
Chemistry 5	25.00
Chrystallography 4	3.00
Electrical Laboratory 1, 2, each	15.00
Electrical Laboratory 10	20.00
Gas Engine Laboratory	10.00
Machine Shop, per term	17.50
Mechanical Laboratory	5.00

Mineralogy 2, 3, each	6.00
Petrography 5	6.00
Physical Laboratory 1, 2, each	7.50
Physical Laboratory 4	10.00
Physical Laboratory 5	15.00
Radio Telegraphy	12.00
Surveying 3, 5, 8 each	5.00
Wood Shop, per term	15.00

ENTRANCE SUBJECTS

Applicants who do not present properly attested certificates for preparatory work must take entrance examinations.

English. Part of the examination time is given for answering questions upon text-books and readings required in the preparatory courses in English; the remainder for writing an essay.

Algebra. The whole subject as far as logarithms, as given in *Wentworth's College Algebra,* or an equivalent in the larger treaties of other authors.

Geometry. Plane and Solid, including the solution of simple problems and numerical examples, as given in the works of *Wentworth's Chauvenet, Newcomb,* or an equivalent in treatises by other authors.

Trigonometry. Plane and Spherical.

Civics. The Constitution of the United States; Federal Government and State Government.

History. General outlines of Ancient, Medieval and Modern History. American History.

Chemistry. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations. A course of at least fifty experiments in elementary chemistry actually performed by the pupil.

Physics. Elementary. The preparation in this subject should include a course of lectures, illustrated by experiments, and recitations from a text-book similar to *Carhart and Chute's* or *Gage's*. In both chemistry and physics the laboratory note-book must be presented.

Botany, Physiology, Physiography, and Zoology. Elementary.

Modern Language. Engineering students must present a two years' course in German, French or Spanish.

Subjects required for entrance to Freshman year:

English	3	History	1
Mathematics	3	French, German or Spanish	2
Science (Chemistry and Physics)	2	Elective	4

THE DEPARTMENT OF CIVIL ENGINEERING

The courses of instruction are designed to prepare students for a thorough and systematic training in the sciences and in the principles of Civil Engineering, to perform intelligently the duties of their profession, either in the office or in some of the responsible positions superintending the construction and operation of public works. To secure these results the student is given, not only a sound theoretical training in the courses of study, but he is also required to study the practical applications of the principles upon which the theory is based. The first two years are devoted to the study of mathematics and the theoretical branches. The last two years are given to the study of applied courses—practical work in the laboratory and field, as much as possible, being required throughout the course.

Sufficient instruction is given in at least one of the Modern Languages to enable the student to read easily and intelligently professional works in this language; the study of English is pursued until the student is qualified to prepare acceptable themes on professional subjects; philosophy, history and economics are required topics. Instruction based upon standard text-books on engineering is given throughout the course by means of lectures, recitations, practice in laboratory, drawing-room and field. This work is largely supplemented by assigning to the student, for solution, practical problems bearing directly upon the subject matter discussed in the class room and requiring original investigation, thus training the student to habits of independence and awakening his interest in the work of his profession.

The department is provided with all the instruments necessary for effective work in the different branches of field engineering. The instrumental outfit consists of surveyor's transits, engineer's transits with levels and vertical circles attached to telescopes, also solar attachments, clinometers, chains, tapes, leveling rods, etc., and an Olson's cement testing machine. After the student is taught the use and adjustment of the instruments, surveys, elementary in character, are commenced and continued progressively until the more difficult principles and methods are understood. In a similar manner is instruction given in the courses of sanitary engineering, hydromechanics, resistance of materials, bridges and roofs, etc., thus familiarizing the student with practical engineering subjects, and the most improved method of execution and designing. A large drafting room offers facilities for the proper study of all the courses in mechanical drawing and design. The room is splendidly lighted from above, well ventilated and contains the latest form of drawing tables. There are suitable arrangements for blue-printing, both by natural and electric light.

The constantly growing city of South Bend, with a population now of over seventy-thousand, is one of the most important manufacturing cities in the Middle West. Some of the largest plants in the world are situated here. One of the greatest water power developments in the United States is located a few miles from the University. Special advantages are thus afforded to students for the inspection of the most modern engineering works now completed or in process of construction. The City Engineer is one of the examining board.

A thesis on some subject approved by the head of the Department connected with the course of study, is required of each student as a condition of graduation. The thesis must embody the result of original research.

THE DEPARTMENT OF MECHANICAL ENGINEERING

The program of studies in Mechanical Engineering, leading to the degree of Mechanical Engineer, is open to young men who wish to prepare themselves for the designing of machinery, with its appurtenances, and for the successful management of power plants. As the program requires a thorough knowledge of pure an applied Mathematics, as well as of Physics, only those capable of adapting themselves to these requirements should take it up. The program of the department is modeled in the twofold belief that a thorough fundamental training is best secured by a study of the practical application of the principles involved, as well as of the theoretical principles.

The work of the department, conducted in connection with other departments elsewhere described, consists of the study, by text-book or letters, of the materials used in mechanical engineering, accompanied by the science of pure mechanical kinematics, which traces the motions of connected parts, without reference to the cause of such motions to the work done or energy transmitted. This is succeeded by machine design, which is a direct development of kinematics, and the course continues throughout the Junior and Senior years.

The courses in Shopwork are most complete. The first year's work is confined to practice in the wood-shop, in which the principles of carpentry, turning, and pattern-making are taught. When the students have become sufficiently skilled in woodwork, they take up the work of the foundry and machine shop. A systematic course of training is provided, which advances the student by easy steps until he has mastered all the details of the work.

The latter part of the Senior year is largely taken up in the preparation of a graduation thesis. Here especially the student is taught to depend as much as possible upon his own resources and abilities in exercising his ingenuity. This is the culminating effort of the program embodying its chief results, and is expected to show considerable originality.

Every possible advantage is given the student wishing to specialize in some of the branches of engineering, toward furthering his knowledge and ability in the particular field desired. He may take up general machine design, steam engine design, specifications and contracts, installation and erecting, original research or gas engine design and operation. A systematic curriculum of study will be outlined in each individual case leading to a complete and proficient knowledge of the work undertaken.

Access may be had to all machinery and apparatus of the University contained in the various power plants and laboratories elsewhere described, and every effort is made by the authorities to make the work as comprehensive as possible.

The laboratories and shops are equipped with all necessary apparatus and machinery. The wood shop is supplied with modern work benches fully equipped with the smaller tools necessary for carpentry, lathes for turned work, jig saws, a pony planer, a joiner, an edge moulder and shaper, a universal trimmer, circular saw with dado and drilling attachments and band saw, the whole forming an adequate equipment for a thorough mastery of jointery, scroll work and patternmaking.

For operating the machine shop there are two ten-horse power motors from which power is transmitted to the various machines by line shafting running the entire length of the building. The latest improved lathes have been provided, nine in number, varying from a five-inch swing in the smallest to a large engine lathe with sixteen-foot bed, having a capacity for work twenty-eight inches in diameter. Two drill presses, a large planer, a shaping machine and a Brown and Sharpe milling machine complete the outfit, thus making the machine shop a model of its kind. There have been completed lately in the machine shop seven new screw cutting lathes of fourteen-inch swing, a high speed bench hand lathe, one twenty-eight inch Sibley and Ware drill press, one horizontal 8x12 slide valve steam engine and a wood milling machine. The equipment is added to regularly, and recently a Seneca Falls lathe of fourteen inch swing and eight foot bed, a Crown high speed lathe, a Toledo punch press and a complete new set of chucks, drills, taps, mandrels and lathe dogs have been installed to meet the additional requirements of the courses. It is the policy of this department to refrain as much as possible from exercise work, and each student is usually taking part in the construction of some new machine or engaged on general repair work for the University, a plan which is regarded superior to a fixed routine of exercises.

In the foundry work the student is instructed in the proper disposition of gates and sprues, the mixing of sand, setting up and drawing simple and complicated patterns and core making. This is supplemented with lectures on the proper mixing and heating of cast iron for the various purposes for which it is used.

In addition to the facilities afforded by the shops, the engineering students have access to the steam and power plants of the University which have been recently remodeled and made to compare favorably with the best contemporary practice. The main steam plant contains two batteries of ten horizontal tubular boilers, aggregating 1200 horse power. In connection with the boilers is installed the necessary testing apparatus as follows: a Worthington hot water meter for measuring the amount of feed water, a feed water thermometer for getting temperature of same, a high range thermometer for termperature of generated steam, a throttling calorimeter for ascertaining the quality of steam and an automatic recording pressure gauge giving a continuous record of the boiler pressure. Provision is made for finding the temperature and pressure of the flue gases by means of a pyrometer and draught gauge and for obtaining samples of flue gas for analysis with Fisher's analysis apparatus. These, with a Carpenter coal calorimeter for determining the heating value of fuel, comprise a full and complete equipment for giving the student an intimate knowledge of the practical part of boiler management and testing. A Webster feed water and purifier, two compound duplex pumps, two vacuum pumps working on the heating system, two large Worthington fire pumps 16x9x12 with a capacity of 1500 gallons per minute, with numerous separators, steam traps, automatic reducing valves, etc., complete the apparatus in the main steam plant. A McEwen high speed automatic engine, an Armington and Sims engine of smaller type and several low speed horizontal engines with polar and roller planimeters, indicators, reducing wheels, slide rules and other necessary instruments, are used in studying the operation of the steam engine, distribution and economy of steam, regulation valve setting and heat wastes.

There have been recently donated to the mechanical laboratory about four hundred brass and iron fittings used in steam and gas engineering, including feed water injectors, sight feed lubricators, oil cups, safety valves, relief valves, different varieties of globe valves, gate valves, tees, elbows, crosses, unions, bushings, and reducers. Many of these have been sectioned to show the dimensions, and facilitate a study of the internal structure and arrangement of parts.

In the gas engine laboratory are installed one horizontal eleven horse power four-cycle engine completely equipped for experimental runs, with indicator reducing motion, prony brake, scales and thermometers, a five horse power two-cycle vertical gas engine of the marine type, a four horse-power horizontal four-cycle gasoline engine with circulating pump and cooling tower, one Motsinger auto-sparker with induction coil, one Apple ignition dynamo with storage battery, two Hendricks automatic igniters together with carburetors, spark plugs, spark coils, indicators, and all necessary equipment for a complete study of the gas engine.

Recent additions include the latest type Kingston carburetor and muffler, a National storage battery, Pittsfield induction coils and ash coils, two Wizrad magnetos with brass armored spark coils, one four engine cylinder distributor and a number of improved standard and meter spark plugs.

A set of castings for an eight horse power engine to be operated by alcohol has been placed in the machine shop, and the work of designing and building the engine will be undertaken by the students.

In the department library, standard authors may be consulted and the current literature on engineering topics is kept on file for reference, as well as a complete line of trade catalogues.

THE SHORT PROGRAM IN MECHANICAL ENGINEERING

Theory, Design and Operation of Gas, Oil, and Vapor Engines.

This program is devoted exclusively to the study of explosive motors, in theory, design, construction and operation.

The rapid progress made in recent years in the design of gas engines, together with their adaptation to the supplying of power for almost every requirement, has led to establishment of this program for young men wishing to make a special study of this branch of engineering.

The essential work of the first year consists of a general descriptive study of the different types of engines with discussions on the general management, operations, care and special uses to which this type of motor may be applied. During the second year the general theory of the gas engine is studied and the designs of an engine for specific purposes is undertaken by each student.

The laboratory work will consist in part of indicator practice, determination of mechanical and thermodynamic efficiency, speed regulation, and economy. To these are added studies in various kinds of ignition, operation of vaporizers and carburetors and practical management of internal combustion engines. A considerable part of the work will consist of the complete adjustment and successful operation on the test-block, under varying loads of the engine built by the student. Experiments in flame, electric and hot tube ignition, operation of vaporizers and carburetors, construction of spark coils and care of motors will complete the work.

The courses in shopwork are intended to give practical application to the theories advanced in the class room by the complete building and testing of a gas engine of a design to be selected by the demonstrator. Each student is required to prepare the patterns and core boxes, machine the castings and forgings, assemble the complete engine and submit a comprehensive report of a test on the machine constructed. If the report proves satisfactory a certificate of proficiency is given to the student and the gas engine becomes his own property.

For admission to this program the student, unless he has completed a regular high school course of study should be 19 years of age, and must show by examination or certificate evidence of a knowledge of algebra as far as logarithms, plane geometry, and his further ability to pursue the studies of the first year. In case a student has not had this preparatory work, he may, with special effort, complete it in addition to the regular work of the course. Candidates shall also write a short essay, which must be satisfactory in spelling, sentence and paragraph construction.

THE DEPARTMENT OF ELECTRICAL ENGINEERING

The remarkable development of electrical industries during the past few years has created a demand for men skilled in the theory and practice of electrical and mechanical work. The study of the subjects arranged in the program of Electrical Engineering is intended to give a general education as well as a special training in the technical branches involved in the various practical applications of electricity in industrial operations.

General theory is given in lectures and by recitations from standard text-books. In the laboratories and shops the operations explained in the class-rooms are performed by the student, in doing which he acquires skill in handling tools and instruments, and obtains a working knowledge of the principles involved. Careful records of the work done in laboratories are kept by the student and are handed in for suggestions and corrections at the end of every week.

The University is located near a great manufacturing center in the growth of which electricity is taking a very prominent part. Electric power generated by steam is now being distributed and utilized in several large plants, some using the three phase alternating system, while others are using the direct current. Several of the largest water power developments in the Middle West are situated within a few miles of the University. From this system we receive three phase alternating currents which furnish light for our buildings and grounds, and power for driving motors in our shops, printing office, etc., all of which are operated by electricity.

There are numerous other transmission lines and electrical power plants operated by water power within a short distance. Our students visit these plants accompanied by an instructor who points out the applications of the text-book theory in the design of electrical apparatus and its operation under actual working conditions.

Each candidate for graduation must present at the end of the Senior year an acceptable thesis embodying the results of an extended original research on an engineering subject, chosen at the beginning of the year, with the approval of the head of the department. The descriptive part must be typewritten, and bound in book form together with the drawings.

The equipment for the laboratory work in electrical engineering includes dynamos typical of the various classes, accessory apparatus and measuring instruments as follows: A three phase A. C. induction motor arranged to operate on a single phase circuit with a condenser compensator, a high frequency 1000 V. 33 K. W. composite wound Wood alternator of the latest type with exciter and a full set of switchboard instruments, several transformers, of different capacity, a high tension transformer for testing insulation, an Edison bipolar 10 K. W. 125 V. generator, a Thompson-Houston arc light machine with regulator and fifteen lamps, a Wood arc machine, capacity 25 light, an Edison bipolar, 3 K. W. 125 V. dynamo with special winding, a Van Depoele compound wound dynamo, a special A. C. 5 H. P. dynamo or rotary converter, a series wound dynamo with wrought iron field, number of small motors, a 10 H. P. induction motor, three phase, 220 volts 60 cycles, a motor generator set consisting of an adjustable speed 8 H. P., D. C. motor, direct connected to a special multiphase, revolving field A. C. dynamo.

A three K. W. three phase rotary converter, an eight K. W. rotary converter, a set of inclined coil alternating current portable instruments, voltmeter, ammeter and wattmeter, telegraph relays, sounders, switchboard, etc., telephone apparatus including subscribers set of various modern types, a fifty drop manual switchboard complete and a lot of separate drops, jacks, switches, lightning arresters, etc., automatic telephone switchboard containing first and second selector and connector switches, interrupter heat coils, etc., and three subscribers sets—with this apparatus all the operations involved in the operation of 10,000 system may be performed, a complete central energy switchboard, several lines and subscribers' sets and a selective signaling four party outfit, a collection of historical sets including Reis' transmitter and receiver, a standard portable bridge, a common portable bridge, a testing battery, a power or foot lathe with wood turning tools, drills and hand tools for metals, a set of tools for metal working, a calibrating lamp rack, a D'Arsonval and common galvanometers, Ballistic galvanometer, standard condenser, etc., for capacity work, resistance boxes, standard meghoms, etc., high resistance Thompson galvanometer, standard cells, voltmeter arranged for the comparison and incandescent lamps, a plug switchboard controlling all circuits, a plating dynamo and a buffer for cleaning and polishing work to be plated, solution tank, etc.,—in all, a complete outfit for electrotype work, a hot wire ammeter, twelve ammeters and voltmeters mostly of the Weston type for direct current measurements, a Kohlrausch bridge for measuring battery resistance, etc., a lot of arc lamps series and constant potential open and enclosed arcs. Wattmeters of various types, a collection of motor starting rheostats, several sets of parts of incandescent lamps showing the various stages in their manufacture, a large collection of porcelain insulators used in electrical work including a lot of insulators for high tension transmission lines, a lot of armature core disks, transformer core stampings, dynamo frames, formed coils, brush holders, pole pieces, samples of insulation, commutator segments, etc., used in dynamos of good design, donated by leading manufacturers of electrical machinery, a case of marked samples of wire insulators, lamps and other constructive materials, a library of practical books of reference and files of leading periodicals and trade publications, a Cooper Hewitt mercury vapor lamp, a high frequency Telsa coil and condenser, a working model of the induction motor, an armature winding model mounted to rotate in bipolar and multipolar fields, a storage battery 25 cells with universal switch to connect for various voltages.

For the work of electricity and magnetism in the courses in physics there are the following: An absolute electrometer, a Holtz machine and apparatus for illustrating static phenomena, four induction coils, six bridges, of different types, several ammeters and voltmeters, one 2,000 lb. electro magnet, standard resistance coils, a historical set of motors showing evolution of the modern machine from the early form of the reciprocating type, ten galvonometers of various types, a complete X-ray outfit, a set of apparatus for wireless telegraphy. Other available apparatus has been previously indicated.

For the work in chemistry, drawing and shopwork, the equipment and facilities will be found described elsewhere in the bulletin.

THE SHORT PROGRAM IN APPLIED ELECTRICITY

Students who do not wish to take the languages and higher mathematics required in the regular four-year program should take up the Short Program, which may be completed in two years. The studies are arranged to give an accurate knowledge of the fundamental theories of electricity and magnetism, as well as a certain amount of skill in handling electrical machinery and appliances. Algebra, geometry, trigonometry, and elementary physics, are included, for they are necessary in order to carry on successfully the practical work of designing, manufacturing and testing or operating electrical apparatus. Training in this practical work is given in the drawing room, the machine shops, and in the electrical and physical laboratories.

The actual conditions of the commercial application of electricity to the distribution of light and power are learned by testing, repairing and making additions to the University plant, and by visiting the numerous electrical establishments in the vicinity, accompanied by an instructor.

The study of the principles of mechanical drawing is taken up early in the program and sufficient practice is given to enable the student to make working drawings and to follow them in the construction of apparatus in the shops and laboratories.

Applicants for admission to the Short program should be at least 19 years of age unless they have completed a regular High School course of study. They should have a fair knowledge of the subjects taught in the common schools, especially arithmetic, and algebra, as far as logarithms, and plane geometry. They shall also write a short essay which must be satisfactory in spelling, punctuation, sentence and paragraph construction. In case a student has not had this preparatory work he may, with special effort complete it in addition to the regular work of the course.

When the required studies have been satisfactorily completed, a certificate of proficiency is issued.

THE DEPARTMENT OF MINING ENGINEERING

The wonderful growth and expansion of the mining industry, not only in this country but in Mexico, Central and South America, has created a constant demand for trained men who have a thoroughly practical as well as theoretical knowledge of mining operations.

The aim of this department is to give the student sufficient training in the various technical branches of mining to enable him to project and successfully carry through a mining enterprise.

The course of studies for the degree of Mining Engineer includes the essential subjects of Mechanical Engineering, particularly those which have special prominence in mining work; for the economical operation of any mine depends to a great extent upon the judicious selection and proper operation of the machinery in the power plant, mill and smelter. Likewise the subjects of Civil Engineering with but few exceptions, are embraced in the mining course, for the reason that many of the problems of Civil Engineering must be solved in the laying out and directing of mining work. Plans and surveys of the surface improvements and underground workings of a mine are made by the Mining Engineer.

In addition to these subjects the course includes the following special branches: Crystallography, Mineralogy, Petrography, Physical and Chemical Geology, Economic Mining Geology, Metallurgy, Ore Dressing, Assaying and a thorough study of Inorganic Chemistry in its application to mining and metallurgy.

Throughout the course the object is not only to present clearly the theory underlying each subject, but to fix it in the mind of the student by practical work in the laboratory, shop, drafting room and in trips to the mining districts where the student becomes familiar with the practical application of the principles laid down in the text-book and lectures.

The subject of the thesis required in this course must be along the line of mining or metallurgy and consist of original research work in one of its special branches, to be approved by the head of the department.

THE DEPARTMENT OF CHEMICAL ENGINEERING

Chemical manufacture has developed so rapidly and grown so exacting that there has arisen a demand for men who not only can create and improve chemical processes strictly so-called, but who can deal with the problems of construction and maintenance as far as they are related to the chemical industries. This often demands a broad knowledge of the effect of chemical forces on materials of construction such as the ordinary engineer does not usually possess and which can come only from a detailed study of chemical laws and chemical action applied not only to laboratory methods but also to technical processes. To prepare young men for such work the course in Chemical Engineering has been designed.

Not only are the chemical reactions of a process considered but their application to commercial development of the work. Also the construction of the plant and the study of types of apparatus best fitted to carrying out such operations are given consideration and the student is expected to make drawings of the suggested plan. Further, an effort is made to develop originality by the study of problems with scant literature.

The student taking up this course is given a thorough traning in chemical principles similar to that outlined in the Course in Chemistry, except that the laboratory period is somewhat shortened. To this training is added a certain amount of the theory and laboratory practice in Mechanical Engineering sufficient for the needs of chemical industries, together with a consideration of electrical currents as used in chemical manufacture.

A carefully prepared thesis on a topic approved by the dean of the department is a requisite for graduation.

THE DEPARTMENT OF ARCHITECTURE

The courses in Architecture have been planned to provide the student with the elements of a liberal training combined with the artistic and scientific studies necessary to equip him for the practice of his profession.

The curriculum required for the degree of Bachelor in Architecture is arranged for the average student to complete in four years, although in some cases it may require a longer period, as a good standing in design must be attained before the degree is given.

The work required for the student wishing to specialize in construction which leads to the degree of Bachelor in Architectural Engineering is the same for the first two years with increased attention to mathematics, and during the last two years a more extended study of constructive problems.

A master's degree will be conferred upon students completing graduate study in residence if such students have received their degree from Notre Dame, or from another school of Architecture of equal standing; upon her own graduates who spend a year in residence at another school or in travel, following an approved program of study and investigation; or at the end of not less than two years if that time is spent in practice and in accordance with university requirements.

A program is arranged covering two years for students who have had some office experience and are equipped to profit by the work.

EQUIPMENT

The Department of Architecture possesses a collection of books, a classified collection of plates and photographs, a file of the best architectural periods, signed architectural drawings from the Ecole des Beaux Arts and from American architects, working drawings and specifications, architectural models and casts.

THE PROGRAM IN DESIGN

It has been the aim of the Department in offering this program so to arrange it that the student pursuing it will have upon completion a liberal education, a practical working knowledge of Construction, and a systematic and thorough training in Architectural Design and Composition.

The course is built up around the work in the drafting room where half of the student's time is spent. The work in Design, beginning in the Freshman year with the study of the orders and simple problems involving their combination and use, and continued in the three following years by means of minor and major problems involving the planning of all classes of buildings from the simplest to the most monumental, is supplemented and rounded out by exercises in the various methods and media of rendering and by a thorough course in freehand and modeling.

The materials and methods of all trades and professions engaged in building operations are systematically studied in the construction classes throughout the four years of the program. The writing of specifications for each branch in labor is studied synchronously. Practical work in the various trades is given so that the student may know good work and thus be able to superintentend construction intelligently. The practical lessons are supplemented by trips to the important building operations and industries in the neighborhood of the University.

The standard hand-books and mill-books are used as supplementary text-books.

Graphic methods of determining stresses in beams, girders and trusses of all forms, are studied and numerous practical problems solved.

Working drawings and details of construction are made under office conditions.

Broadly speaking, it is the purpose of the Department in outlining the construction courses to equip the student to solve by *office methods* any problem he may meet in ordinary practice; it is taken for granted that graver problems requiring a deep knowledge of the higher mathematics may well be left to the architectural engineer.

In the last year of the program a series of lectures are given on estimates, contracts, law, business relations and professional ethics and practice. Architects of high professional standing will give a number of lectures in this course.

A history of architecture and of the allied arts is studied in a course covering four years. The method is a combination of lectures, recitations and research.

Courses in English, history, economics and philosophy complete the curriculum.

In the Graduate Year advanced work in criticism and research is done and larger and more complicated problems are given in design.

Thesis. The senior year is given up largely to the working out of a thesis in design.

THE ENGINEERING PROGRAM

The science of engineering has long since outgrown the practical limits of one man's abilities. To be thorough, the engineer must specialize. One of his specializations is in Architecture. His services are needed to frame important buildings, to design their foundations and to protect adjoining property while they are in erection. The Department offers the Program in Architectural Engineering because there is need of the service of the men who complete it.

Students desiring to become Architectural Engineers should have a bent for mathematics and for painstaking, exact drafting.

The program of studies differs from that of the Program in Design chiefly in the following particulars: Courses in pure and applied mathematics are given more prominence; the more important construction courses go deeper into theory; freehand work ends with the second year; the study of Historic Ornament and the Histories of the "Allied Arts" is omitted; and a relatively greater amount of time, increasing each year is spent in structural design.

The Graduate year is largely spent in solving of problems of the first order in architectural engineering.

EXPLANATION OF "HOURS"

A class hour means one hour of recitation or lecture and one to two hours of preparation. A freehand or design hour means at least two actual hours in the drafting room.

THE SHORT PROGRAM

The scheme of studies for the Short Program comprises most of the work of the complete program that is essentially architectural.

Ordinarily, the same entrance subjects are demanded for the Short Program as for the Programs in Design and Engineering. A student who has not had the regular preparatory subjects but who is sufficiently mature and has had enough practical experience to warrant his following the work with profit, may be allowed to take up the courses in the Short Program. Mathematics and Physics must be taken in regular form if not previously studied. The ability to write correct English is a requisite for a Certificate of Proficiency in Architecture.

THE DEPARTMENT OF INDUSTRIAL ENGINEERING

The Department of Industrial Engineering offers the degree of Industrial Engineer. The courses leading to the degree of Industrial Engineer combine the fundamental theory and practice of the electrical and mechanical engineering courses with the basic principles of business administration and the application of scientific management to the shop and factory.

The department of Commerce is offering a one year course in Engineering Administration for graduates of any of the engineering programs of studies. This course of studies which may be completed within one year leads to the degree of Engineering Administrator. Those students who would prefer to complete a regular engineering course rather than take the course here offered in Industrial Engineering will be able to complete the regular four year course in engineering and the one in Engineering Administration in five years' time. If a student wishes to complete both these courses in four years time he may do so by taking the work offered by the Department of Commerce in four summer sessions at the University.

Students who prefer to take work in the department of Chemical Engineering rather than certain subjects offered by the departments of Mechanical and Electrical Engineering may make this substitution. The course of studies may be arranged with the head of the department of Chemical Engineering. The Taylor and Emerson systems with reference to Commercial Chemistry will be used.

STUDIES PRESCRIBED FOR THE DEGREE OF CIVIL ENGINEERING

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Trigonometry	4	1	Anal. Geom.	5	3
Algebra	4	2	English	3	1
English	3	1	Chemistry	4	3
Chemistry	4	2	Drawing	2	2
Drawing	2	1	Surveying	2	1
Language*	4		Language*	4	

SOPHOMORE YEAR

Calculus	6	4	Calculus	5	5
Des. Geom.	3	1	Calculus	1	6
Surveying	6	3	Des. Geom.	3	1
Geodesy		6	R. R. Survey'g	5	6
Physics	4	2	Physics	4	2
Physics	2	4	Physics	2	4
Drawing	1	5	Drawing	1	5

JUNIOR YEAR

Analytic Mechanics	5	8	An. Mechanics	3	8
Mineralogy	2	2	Mechanics of Materials	5	10
Drawing	2	6	Geology	3	1
Philosophy	4	10	Drawing	2	7
History	4	7	Philosophy	4	10
Economics	5	6	Astronomy	2	1
			Roads, Pav'mt	2	1

SENIOR YEAR

Engineering	5	12	Engineering	5	12
Hydromechan	3	16	Hydromechan	3	16
Bridges, Roofs	5	14	Graph. Stat.	5	15
Sanitary Engineering	2	13	Sanitary Eng.	2	13
			Bus. Law	4	9
Politics	4	2	Thesis		

*French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF MECHANICAL ENGINEER

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Trigonometry	4	1	Anal. Geom.	5	3
Algebra	4	2	Drawing	2	2
Drawing	2	1	Chemistry	4	3
Chemistry	4	2	English	3	1
English	3	1	Shopwork	1	6
Shopwork	1	6	Language*	4	
Language*	4				

SOPHOMORE YEAR

Calculus	6	4	Calculus	5	5
Drawing	2	3	Drawing	2	4
Physics	4	2	Physics	4	2
Physics	2	4	Physics	2	4
Shopwork	2	8	Shopwork	2	8
History	4	7	Economics	4	6

JUNIOR YEAR

Applied Mech	5	8	Applied Mech	2	16
Kinematics	3	5	Applied Mech	3	10
Calorimetry	2	5b	Mach. Design	2	6
Shopwork	2	9	El. St. Eng.	5	14
Philosophy	4	10	Elec. Measure	1	5a
Politics	4	2	Shopwork	3	9
			Philosophy	4	10

SENIOR YEAR

Materials of Engineering	3	2	Steam Power Plants	5	3
Thermodynam	5	1	Steam Boilers	3	4
Steam Power Plants	5	3	Thermodynam	5	1
Mechan. Lab.	3	8	Surveying	2	1
Elective	4		Surveying 1	1	2
			Bus. Law	4	9
			Thesis		

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*French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF ELECTRICAL ENGINEER

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Trigonometry	4	1	Anal. Geom.	5	3
Algebra	4	2	Chemistry	4	3
Chemistry	4	2	Drawing	2	2
Drawing	2	1	English	3	1
English	3	1	Shopwork	1	6
Shopwork	1	6	Language*	4	
Language*	4				

SOPHOMORE YEAR

Calculus	6	4	Calculus	5	5
Physics	4	2	Calculus	1	6
Physics	2	4	Physics	4	2
Drawing	2	3	Physics	2	4
History	4	7	Drawing	2	4
Shopwork	2	8	Economics	4	6
			Shopwork	2	8

JUNIOR YEAR

Dyn'mo Elec.			D. C. Engin'g	3	5
Machines	4	4	Applied Mech	2	16
Applied Mech	5	9	Applied Mech	3	10
Kinematics	3	4	El. St. Eng.	5	14
Physics	2	5b	Physics	2	5a
Philosophy	4	10	Philosophy	4	10
Shopwork	2	9	Shopwork	2	9
Elec.Eng. Club		18	Elec.Eng.Club		18

SENIOR YEAR

Alternating			A. C. Mach.	3	7
Currents	5	6a	Probs. of Eng.	2	8
Problems of			Hydr. Pow. Pl.	3	12
Engineering	2	8	Designing	2	9
Hydraul. Eng.	3	11	Elec. Lab.	3	10
Designing	2	9	Business Law	2	9
Electrical Lab.	3	10	Surveying	2	1
Elec.Eng.Club		18	Surveying	1	2
Politics	4	2	Elec.Eng.Club		18
Elective	1		Thesis		

*French, German or Spanish.
Summer Thesis between Junior and Senior Years.

STUDIES PRESCRIBED FOR SHORT PROGRAM IN MECHANICAL ENGINEERING

FIRST YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Geometry	5		Trigonometry	4	1
Drawing	2	1	Drawing	2	2
Shopwork	2	8	Shopwork	2	8
Physics	3	1a	Physics	3	1a
Physics	2	1b	Physics	2	1b
Gas Engines	5	10	Vapor Engines	5	10
English	3		English	3	

SECOND YEAR

Gas Engine Design	12	11	Gas Engine Design	12	11
Gas Power Plants	3	7	Gas Engine Laboratory	3	13
Gas Engine Construction	3	12	Gas Engine Construction	3	12
Gas Engine Laboratory	3	13	Engines and Boilers	3	9

STUDIES PRESCRIBED FOR SHORT PROGRAM IN APPLIED ELECTRICITY

FIRST YEAR

Geometry	5		Trigonometry	4	1
Drawing	2	1	Drawing	2	2
Shopwork	2	6	Shopwork	2	8
Physics	3	1a	Physics	3	1a
Physics	2	1b	Physics	2	1b
Applied Electricity	5	1	Applied Electricity	5	1
English	3		English	3	

SECOND YEAR

Gas Power Pl'ts	3	7	Engines and Boilers	3	9
Designing	2	9	Designing	2	9
Shopwork	2	8	Shopwork	2	9
Dynamo Machinery	5	6b	Dyn. Machinery	5	6b
Applied Electricity	5	2	Applied Elecricity	5	2
Economics	4	6	Politics	4	2

STUDIES PRESCRIBED FOR THE DEGREE OF MINING ENGINEER

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Trigonometry	4	1	Anal Geom.	5	3
Algebra	4	2	Chemistry	4	3
Chemistry	4	2	Drawing	2	2
Drawing	2	1	Shopwork	1	6
English	3	1	English	3	1
Mining Eng.	3	1	Mining Eng.	3	1
Shopwork	1	6	Surveying	2	1

SOPHOMORE YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Calculus	6	4	Calculus	3	5
Physics	4	2	R R Surveying	5	6
Physics	2	4	Physics	4	2
Chemistry	4	5	Physics	2	4
Drawing	1	5	Chemistry	4	5
History	4	7	Drawing	1	5
			Geology	3	1

JUNIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Applied Mech.	5	9	Applied Mech	2	11
Mineralogy	2	2	Applied Mech	2	10
Mineralogy	3	3	Mineralogy	3	3
Crystall'phy	5	4	Economics	4	6
Philosophy	4	10	Mine Survey'g	1	2
			Philosophy	4	10
			Shopwork	2	8

SENIOR YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Ore Dressing	3	4	Assaying	5	3
Metallurgy	3	1	Economic Mining Geol	2	7
Phys. & Chem. Geology	3	6	Graph Statics	5	15
Petrography	2	5	Petrography	2	15
Gas Engines	5	10	Eng. & Boilers	3	9
Mat of Engin'g	2	2	Bus. Law	4	9
			Thesis		

SUMMER COURSE.

This course consists of actual Mining Engineering practice in the mines, under the direction of the department. Each student is required to make a complete, accurate underground survey with a mining transit, connecting the mine traverse with one on surface, through vertical and inclined shafts. A study of the different methods of mining in several mines are made with special attention given to Geology in its relation to economic mining; ore dressing mills and metallurgical plants are carefully inspected to familiarize the student with the best concentrating and smelting methods. Sixty hours a week for four weeks.

STUDIES PRESCRIBED FOR THE DEGREE OF CHEMICAL ENGINEER

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Trigonometry	4	1	Anal. Geom.	5	3
Algebra	4	2	Chemistry	4	3
Chemistry	4	2	Drawing	2	2
Drawing	2	1	English	3	1
English	3	1	Shopwork	1	6
Shopwork	1	6	Language*	4	
Language*	4				

SOPHOMORE YEAR

Calculus	3	4	Calculus	3	5
Physics	4	1	Physics	4	2
Physics	2	4	Physics	2	4
Drawing	2	3	Drawing	2	4
Chemistry	4	5	Chemistry	4	5
Shopwork	2	8	Shopwork	2	8
Chemistry	3	6a	Chemistry	3	6a
Chemistry	1	6b	Chemistry	2	6b

JUNIOR YEAR

Applied Mech	5	8	Chemistry	5	15
Kinematics	3	7	Applied Mech	3	10
Philosophy	4	10	Applied Mech	2	16
Calorimetry	2	5b	Steam Boilers	3	4
Chemistry	2	8	Philosophy	4	10
Economics	4	6	Elec. Measure	2	5a

SENIOR YEAR

Chemistry	3	9a	Chemistry	3	9a
Chemistry	3	9b	Chemistry	3	9b
Chemistry	3	13a	Chemistry	3	14
Chemistry	1	13b	El. St. Eng.	5	14
Chemistry	3	14	Mech. Lab.	2	8
Chemistry	2	11a	Bus. Law	4	9
Chemistry	1	11b	Thesis		
Chemistry	1	11c			
Politics	4	2			

*French, Latin or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF ARCHITECTURE

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
English	3	1	English	3	1
El. of Arch	4	1	El. of Arch.	4	1
Construction	3	1	Construction	3	1
Drawing	2	1a	Drawing	2	1b
Arch. Drawing	2	8	Arch. Drawing	2	8
Language*	4		Language*	4	

SOPHOMORE YEAR

English	4	2,3	English	4	2,4
Design	8	2	Design	8	1
Construction	3	2	Construction	3	3
Drawing	2	2a	Drawing	2	2b
Graphics	2	6	Graphics	2	6
			Theory of Plan	1	7

JUNIOR YEAR

Philosophy	4	10	Philosophy	4	10
Design	8	3	Design	8	10
Hist. of Arch.	3	1b	Hist. of Arch	3	2a,2b
Hist. Ornam'nt	2	4	Drawing	2	2b
Drawing	2	3a	Sanitation	1	6
Heat and Vent.	1	4	Electricity	1	3

SENIOR YEAR

Economics	4	6	Bus Ethics	1	7
History of Art	2	3a	History of Art	2	3b
Drawing	2	4a	Drawing	2	3b
Design	4	2	Modeling	1	5
Politics	4	2	Design	10	4
			Bus. Law	4	9
			Thesis		

*French, Latin or Spanish.

Mathematics may be substituted for the Language of the Freshman year provided the student has had at least two years of Language.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF ARCHITECTURAL ENGINEERING

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Trigonometry	4	1	Anal. Geom.	5	3
Algebra	4	2	English	3	1
English	3	1	Construction	4	1
Construction	3	1	Drawing	2	8
Drawing	2	8	Drawing	2	1b
Drawing	2	1a	El. of Arch.	4	1
El. of Arch	4	1			

SOPHOMORE YEAR

Calculus	6	4	Caluculus	5	5
Physics	4	2	Calculus	1	6
Physics	2	4	Physics	4	2
Drawing Mech	2	3	Physics	2	4
Construction	3	2	Draw. Mech.	2	4
Design	5	2	Construction	3	3
			Design	5	2

JUNIOR YEAR

Applied Mech.	5	8	Applied Mech	2	16
Sanitary Eng.	2	13	Applied Mech	3	10
Electricity	1	3	Sanitary Eng.	2	3
Heating and Ventilating	1	5	Surveying	2	1
			Surveying	1	2
History of Architecture	3	1a,1b	History of Architecture	3	2a,2b
Struct. Design	8	5	Struct Design	8	5

SENIOR YEAR

Bridges and Roofs	5	14	Grap. Stat.	5	15
Drawing	2	6	Bus. Ethics	1	1
Structural Design	10	6	Structural Design	10	6
			Thesis		
Philosophy	4	10	Philosophy	4	10

SHORT PROGRAM IN ARCHITECTURAL ENGINEERING

FIRST YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Desc. Course
Construction	3	1	Construction	3	1
Architectural Drawing	2	8	Arch. Drawing	2	8
Drawing	2	1a	Drawing	2	1b
Elements of Architecture	12	1	El. of Arch.	4	4
			Design	8	2
			Theory of Planning	1	7

SECOND YEAR

Hist. of Arch.	3	1a,1b	Hist. of Arch.	3	2a,2b
Construction	3	2	Construction	3	3
Graphics	2	7	Construction	3	3
Heat and Ventilation	1	5	Graphics	2	7
Electricty	1	3	Sanitation	2	6
Drawing	4	2a,2b	Bus. Ethics	1	7
Design	8	3	Drawing	4	3a,3b
			Modeling	2	5
			Design	8	3

STUDIES PRESCRIBED FOR THE DEGREE OF INDUSTRIAL ENGINEER

FRESHMAN YEAR

SUBJECTS First Term	Hrs. a Week	See for Desc. Course	SUBJECTS Second Term	Hrs. a Week	See for Decs. Course
Trigonometry	4	1	Anal. Geom.	5	3
Algebra	4	2	Chemistry	4	3
Chemistry	4	2	Drawing	2	1
Drawing	2	1	English	3	2
English	3	1	Economics	4	6
Business Law	4	9	Shopwork	1	14b
Shopwork	1	14a	Cham. of Com.		24
Cham. of Com.		24			

SOPHOMORE YEAR

Calculus	6	4	Calculus	5	5
Physics	4	2	Calculus	1	6
Physics	2	4	Physics	4	2
History	4	7	Physics	2	4
Economics	2	7	Contracts Etc.	5	23
Economics	3	8	Economics	4	10
Shopwork	1	14c	Shopwork	1	14d
Cham. of Com.		24	Cham. of Com.		24

JUNIOR YEAR

Applied Mech.	5	8	Applied Mech	3	16
D. C. Mach.	4	20	Applied Mech	2	10
Mach. Design	3	6	El. Stm. Eng.	5	14
Physics	2	5a	Surveying	2	1
Accounting	4	1	Accounting	4	2
Philosophy	4	10	Philosophy	4	10
Cham. of Com.		24	Cham. of Com.		24

SENIOR YEAR

Prime Movers Steam	3	21	Prime Movers Hydr.	3	2
A. C. Theory	3	23	A. C. Mach.	3	24
Elec. Lab.	3	10	Elec. Lab.	3	10
English	4	10	English	4	10
Economics	5	25	Economics	4	5
Cham. of Com.		24	Cham. of Com.		24

College of Law

COLLEGE OF LAW

With the year 1919-1920, the College of Law of the University of Notre Dame began a new era. This year, for the first time in the history of the school, the law men are afforded a distinctive law building all their own, and a law atmosphere separate and apart from the other schools and colleges. These features, together with the splendid new and modern equipment and facilities for conducting the law course, lend dignity to the College, offer singular advantages to the law students and stimulate in them a zest for studying, understanding and learning the law. Nowhere in the country are these conditions better.

The handsome building in which the law courses are given is called the Hoynes College of Law, named in honor of William Hoynes, Dean-Emeritus, whose lifelong labors laid the splendid foundation for the present College of Law.

LAW LIBRARY

The law library, quite extensive and adequate for the needs of our large and growing law school, is continually augmented by the arrival of new volumes. There are the U. S. Supreme Court Reports, complete; Federal Cases; Federal Reporter; United States Statutes and Digests; Meyer's Federal Decisions; The National Reporter System, complete with Digests; Lawyers' Reports Annotated, both old and new series; American Reporter system, American Decisions, American Reports; American State Reports; English Ruling Cases; British Ruling Cases; American and English Annotated Cases; Annotated

Cases; Moak's English Reports; Petersdorf's Abridgment; American and English Corporation Cases; Moore's International Law Digest; American and English Encyc. of Law; Cyc., Ruling Case Law, Words and Phrases; Encyc. of Pleading and Practice; Encyc. of Evidence; Standard Encyc. of Pleading and Practice; hundreds of text books, of the old and modern writers. There are the Indiana Supreme and Appellate Court Reports, complete; New York Common-law Reports; New York Court of Appeals Reports. Vermont Reports.

There are now coming the state reports of the individual states of Ohio, Illinois, Iowa, Michigan, Wisconsin, Minnesota, Pennsylvania, Massachusetts, Missouri, California and Connecticut. Arrangements have been made for acquiring the state reports of all the states to the point where the Reporter System begins to publish them, and the Codes and Statutes have also been applied for, so that the law of every state will be made available to every law student.

The library has a capacity of twenty thousand volumes, is admirably equipped with stacks, tables and chairs, has high ceiling, is perfectly lighted, day and night, and like the court room and class rooms, is so arranged and cared for as to afford the most commodious, convenient and cheerful accommodations for efficient use.

COURT ROOM

The court room, which is a marvel of beauty and perfection, is conveniently located on the ground floor, opposite the law library. The court room, in its equipment, arrangement and faithful compliance with the requisites of the actual court, is in fact superior to many real court chambers. Here are held the various sessions of the University courts in the strictest observance of the procedural law,—pleading, practice and evidence,—trial and appellate. The College issues a quarterly publication called the Notre Dame Law Reporter, which, as an exhibit of the practical work of the College speaks for itself.

The Notre Dame Circuit Court holds its sessions in a fully equipped court room containing a bench for the judge, perfect accommodations for the jury, ample room at the bar for litigants and their attorneys, witness box, stenographer's table, and offices for the clerk, sheriff and bailiff of the court. The bar is raised and separated from the auditorium, which has a seating capacity of one hundred.

CLASS ROOMS

The class rooms, like the court room, are equipped with the beautiful and substantial American, steel pedestal, tablet arm chairs, the latest word in modern lecture room accommodation. One hundred and fifty of these mahogany finished chairs are arranged in semi-circular form in front of the instructor's rostrum. There are two such large rooms which together with the court room, afford ample accommodation for the large student body and the entire faculty of the School of Law.

ORGANIZATION AND SYSTEM

The law faculty comprises six resident instructors, all of whom are graduates of the leading law schools of the country, most of them experienced in the practice of law, and three of whom have been regular judges of city, and circuit courts. Four of the faculty devote their entire time and service to the College of Law while the other members of the faculty also engage in the law practice.

The classes of the course are arranged in groups according to their relationship and the logical order of their study and with due regard to the time to be devoted to each class subject. These classes are assigned to the various instructors with a view to the instructor's special qualification and experience to teach them. The course is conducted under the careful supervision of the dean of the College to the end that the best methods may be applied and the highest degree of efficiency attained in the teaching department, thereby assuring the students the greatest possible measure of success in the course.

A special advantage to the law student at Notre Dame is his daily association with the instructors and the personal assistance rendered him and the special interest taken in him by the law faculty as well as by the administrative officers of the University.

METHODS OF INSTRUCTION

Experience at Notre Dame has confirmed the opinions of eminent law teachers that the case method alone is not adequate to teach a thorough and comprehensive knowledge of the law. Excellent as the case method is for imparting a knowledge of the particular principles of the law applicable in the cases analyzed, a general idea of the law as a whole, its main features and its universal concepts can not be learned without the aid of the text-book. Therefore the law is taught here by text-book assignments as well as cases both explained and illustrated by the class-room talks of the instructors. In addition to these daily assignments frequent written tests and the quarterly examinations are given and class records are kept of the student's work.

INTRODUCTION TO THE STUDY OF LAW

As an introduction to the study of law the students are given a course of preliminary lectures to acquaint them in a general way with the system of law as a whole, its various classifications and those concepts and principles underlying the whole law so necessary to an intelligent and successful study of the various branches of the law prescribed in the course for study. These lectures may be briefly outlined as follows: the nature of law; law as it effects the individual, organized society and nations; the system of American jurisprudence; the common-law and equity systems, their origin, development and relation; our constitutional and statutory law system and their relation to the common law; the sources of the law, custom, judicial decisions and legislation; judicial systems and the processes of the courts; higher court decisions as precedents and the reporter system; the law divided into two great branches, the substantive law and the law of procedure—rights and remedies—and these branches again divided respectively into the law of contracts, wrongs, and property and practice, pleading and evidence, these in turn divided into the special branches of the prescribed course; where to find the law; how to study the law.

THE LAW AND HOW TO PRACTICE IT

The lawyer's profession is a practical one and most law students intend to practice the law. It is frequently said of the law schools of the country that their courses are not practical that they teach the substantive law to the exclusion of the more practical branch of the law, the law of procedure.

The substantiative law operates *proprio vigore* to establish the rights and obligations of parties. When such right is violated the substantive law creates a secondary right which is denominated a right of action. Then it is that the law of procedure applies, and it is the knowledge of this law that enables the practitioner to invoke the jurisdiction of the courts and the strong arm of the state to secure his client's rights and redress his wrongs. A law course therefore, to be practical should teach not only the substantive law but also the law of procedure.

To meet this condition the law course as now prescribed at Notre Dame is intended not only to teach the law but how to practice it as well. Provision has been made for a systematic course in civil procedure and a thorough and practical court system to operate throughout the entire three years of study.

COURSE OF PROCEDURE

In addition to criminal procedure which is taught in the first year there is also a preliminary course in civil procedure consisting of the study of common-law and equity courts, the original writs and processes, the common-law forms of action and remedies and relief in equity. Not only does this serve as a beginning of the course in practical procedure but it enables the law student from the outset to better understand the substantive law taught through the application of the common-law actions and remedies. This course is followed in the second year by a complete course of pleadings and practice at common-law, the making of issues in the various common-law actions, equity pleading in general and as applied in the federal courts, and pleadings and practice under the code. The third year is devoted to the making of issues in the principal civil actions under the code, trial practice and appellate procedure. The course in federal procedure is also given in this year.

THE UNIVERSITY COURTS

These consist of the Criminal Practice Court, the University Moot Court, the Notre Dame Circuit Court and the Supreme Court of Notre Dame. These courts constitute a thorough and practical system and are kept in operation throughout the three years of the law course. The Criminal Practise Court is open to the first year law students for criminal pleading and practice immediately after the course in criminal law and procedure. Hypothetical cases are submitted to regularly chosen grand juries and prosecuting attorneys and indictments are voted and returned. Warrants are issued, arrests made and attorneys appointed for the defendants. Motions to quash are argued, pleas entered and arguments made before the court and jury on the question of conviction or acquittal. Many hypothetical cases are submitted to the students for the preparation of affidavits and indictments thereon and for argument in the court. Thus all the students are given a start in court practice in their first year. The University Moot Court is kept busy throughout the junior year in the preparation and argument of cases on the law applicable to hypothetical statements of fact, principally in civil cases. When the law of evidence is taught in course of the second year the Notre Dame Circuit Court opens, and here the students apply all the law procedure, pleading, practice and evidence. Throughout the senior year practice is had with a view of teaching the students how to make trial records, save exceptions and avail themselves of alleged error on appeal to the Supreme Court. Each candidate for a degree is required to prepare at least one record and transcript together with an assignment of error and brief thereon in the Supreme Court of Notre Dame.

These courts are all fully organized, have their regular officers and official records. Four students are assigned to each case and all are thus made to engage in the active practice. It is thought that this system of procedure and practice will so qualify the graduate that he may with confidence in himself begin the active practice of his profession.

COURSES OF STUDY

The prescribed course of study in the Law School itself covers a period of three years and leads to the Degree of Bachelor of Laws. An additional year of resident, graduate work in the school merits the Degree of Master of Laws. The requirements for the Degree of Doctor of Laws or Doctor of Civil Laws are prescribed by the University and the College of Law upon proper application therefor.

A six-year course has also been arranged by which two degrees may be acquired,—the degree from the College of Arts or Science and the degree from the College of Law.

REQUIREMENTS FOR ADMISSION

Students who have a bachelor's degree or who have complete at least one year of college work, the equivalent of the courses prescribed in the University, are eligible to enter the three year course of law as candidates for the degrees.

Graduates of a four year high school or preparatory school of recognized standing, evidenced by diploma or certificate from such school, will be admitted to the four-year course, the first year of which consists of certain college subjects, some prescribed and some elective and including the elements of law.

Those who have not high school graduation or certified credits equal to those required for entrance into the other colleges of the University, may obtain such credits by examination in the subjects required, and may acquire additional credits by taking the courses outlined for the regular school year and the summer school of the University.

A few men of advanced age and practical business or office experience, who are otherwise specially qualified for the study of the law, may apply to the University for admission as special students.

Students of other law schools will be given such advanced rating in the School of Law as warranted by the character of the school from which they come and the certificate of credits attained there. Only schools of known repute and standing as compare favorably with the College of Law of the University of Notre Dame will be recognized.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF LAWS

FRESHMAN YEAR

SUBJECTS Second Term	Weeks	Hours per Week	SUBJECTS Second Term	Weeks	Hours per Week
Introductory Lectures and Study of Cases	18	1	Persons and Domestic Relations	18	2
Principals of Liability and Damages	18	2	Common-law Plead'g Forms	18	2
Common-law Actions	18	2	Torts	18	5
Contracts	18	5	Sales (8) Bailments (5)	13	5
Criminal Law & Procedure	18	5	Personal Property	5	5
Selected Read'g	18	1	Crim'l Practice Court	18	1
Public Speak'g	18	1	Public Speak'g	18	1

JUNIOR YEAR

Agency	8	5	Equity&Trusts	13	5
Partnership	10	5	Real Property, Mortg's, Liens, Conveyancing	18	5
Real Property	18	5	Bills & Notes	12	5
Finding and Briefing Law	2	5	Insurance	6	5
Wills & Decedents Estates	16	5	Evidence	18	3
Evidence	18	3	Code, Equity Pleading	18	2
Civil Pleading	18	2	Notre Dame Circuit Court		
Jun. Moot C't			Publ. Speak'g	18	1
Public Speak'g	18	1			

SENIOR YEAR

Quasi Contracts	4	5	Public Utilities	4	5
Private Corp.	14	5	Municipal Corp.	9	5
Suretyship	10	5	Conflict of Laws	5	5
Bankruptcy	8	5	Fed'l Procedure	12	5
Const'l Law	18	3	Legal Ethics	6	5
General Practical Plead.	18	2	Const'l Law	18	3
Notre Dame Circuit Court			Trial & Appellate Pract.	18	2
Supreme Court of N. D.			Notre Dame Circuit Court		
			Supreme Co'rt of N. D.		

Courses of Instruction

(In the description of courses of instruction an hour means fifty minutes in the recitation or lecture room and at least one hundred and twenty minutes in the laboratory, the drawing room or the shop. A term means a half year, or eighteen weeks.)

ACCOUNTING

[Students in Accounting will have an opportunity to take up work in typewriting, phonography, commercial arithmetic and all elementary commercial subjects.]

1. **Elementary Accounting.** The principles underlying accounting in its simplest forms as connected with bookkeeping and as a development of the same.
[Four hours a week for one term.]

2. **Intermediate Accounting.** Continuation of Course 1. Simple problems.
[Four hours a week for one term.]

3. **Advanced Accounting.** The theory of accounting and auditing. Subject of general accounting completed. Advanced problems.
[Four hours a week for one term.]

4. **Advanced Accounting.** Continuation of Course 3. Special problems. C. P. A. problems.
[Four hours a week for one term.]

AGRICULTURE

AGRONOMY

1. **General Farm Crops.** Field Crop Group. Corn, wheat, oats, barley, rye, grasses and legumes; botanical study; cultural methods, judging and testing of grain; use and marketing of grains; diseases and insects.
[First semester. Recitations three hours.]
[One laboratory of four hours.]

2. **Advanced Grain Crop Production.** Special phases of grain crop production are discussed in class. Fer-

tilizers in relation to grain crop production will receive emphasis in this course. Laboratory work will be devoted largely to identifying, comparing and judging grain.

[Second semester. Two hours recitation.]
[One laboratory of two hours.]

3. Forage Crops. Study of forage crops and fiber crops with special reference to their history, method of development, growth, distribution, culture and use. Annual forage crops including sorghums, rape, millets, legumes and cereals are studied with reference to their production and uses for pasture, silage, soiling, fodder and hay.

[First semester. One hour recitation.]
[One laboratory of two hours.]

4. Seed Identification. Propagation control and eradication of weed seed. Laboratory consists of identifications of various farm crops and weed seed, germination and purity testing; collecting and identifying weed seeds in the field.

[First semester. One hour recitation.]
[One laboratory of two hours.]

5. Advanced Grain Judging and Breeding. Advanced work in corn and small grain judging; advanced work in grain breeding.

[First semester. Two hours recitation.]
[One laboratory of two hours.]

6. Soil Physics. Soil Series. Origin, formation and classification of soils; moisture, temperature, preparation of the seed bed drainage. Students make soil tests for acidity, phosporus, nitrogen and potassium.

[First semester. two hours recitation.].
[Three laboratories of six hours.]

7. Soil Fertility. Maintenance of fertility, commercial fertilizers; the effect of barny manure and green manure; the effect of various crops upon the fertility of the soil.

[Second semester. Two hours recitation.]

[Three laboratories of six hours.]

8. Soil Management. This course deals with handling of various types of soils such as muck, clay, sand and wet soils. Crop rotation for various soils and types of farming will receive special emphasis. Prerequisites, Courses 7 and 8.

[Two recitations, two hours laboratories.]

9. Farm Management. This course is a study of business principles in farming; the selection of a farm; capitalization; profits; rents; farm labor; farm equipment and layout.

[Second semester. Five hours recitation.]

Students will make farm records and surveys for laboratory work.

10. Elective. Special problems in crop production. Crop Breeding, Soil Bacteriology, Grain Breeding and Forage Crop problems.

[Open only to seniors and graduates. By appointment.]

FARM MECHANICS

1. Agricultural Drawing. It is essential for the workman of the present time that he should be able to read ordinary working drawings readily and take measurements from them intelligently. He should also understand the relation between scale drawings and the work he is to produce from it. The modern farm owner or manager requires a knowledge of technical drawing to better understand the Government and State Bulletins, periodicals, and catalogues which he uses. This course consists in reading blue prints, freehand sketching with pencil from various models of different machine parts, finding the dimensions and drawing to a scale with the use of instruments. The principles of Orthographic Projection.

[Three hours per week for one term.]

2. **Farm Shop Work.** This course contains essential facts concerning common bench tools. It describes their action, explains their adjustment, shows how they may be kept in order. It contains a course of practice by which ability to use tools may be acquired. Exercises in shaping and grinding edge tools, sharpening saws, the use of the steel square. Lumbering and milling. Classification of various woods and their uses. Wood and wood finishing.

[Three hours per week for one term.]

3. **Concrete on the Farm.** Concrete has become one of the greatest building materials of the present day. It has become the greatest single agent for bringing the farm to the maximum efficiency. The countless uses to which it is being put and numberless ways in which it can be employed upon the farm have made it practically invaluable. The object of this course is to give the student a practical training in the various uses of concrete on the farm. The composition and nature of cement, concrete aggregates, making of moulds for cement, preparing concrete mixtures, mixing and placing concrete.

[Three hours per week for one term.]

4. **Farm Machinery and Farm Motors.** The steady increase and constant development of farm machinery

at the present day has created a big demand for skilled farm mechanics. This course embraces the study, care and operation of farm machines such as binders, planters, plows, cultivators, gas engines and tractors.

[Two hours per week for one term.]

5. **Farm Blacksmithing.** This course takes up the study of forge, the care and operation of forge fires, forging and tempering steel tools, welding, drawing out and bending, and making general forgings.

[Three hours per week for one term.]

6. **Agricultural Drafting.** This course takes up the study of mechanical drawings from free-hand sketches, from machine parts, sections, line shading, tracing, blue-printing. A series of accurate plates is made illustrating the principles of orthographic and spherical projections, Isometric projections, shades, shadows and perspective.

[Three hours per week for one term. Prerequisite; course one.].

7. **Farm Construction.** The study of the Farm Shop and its application in constructing farm conveniences such as feed racks for cattle, hay racks, bins, brooders, butter workers, poultry appliances, troughs, tanks, fence work, gates, plank drags, etc.

[Four hours per week for one term. Prerequisite: Course two.]

8. **Cement and Reinforced Concrete.** The study of reinforced concrete. The laying of foundations, floors, pavements and the construction of drain tile, sewer pipe, building blocks, fence posts, columns and ornamental work. Machines and various apparatus built

by the Farm Mechanics Department are used for testing the compression, tension and breaking stress of concrete.

[Two hours per week for one term.]

9. Agricultural Drawing and Design of Farm Structures. This course embraces Agricultural drawing and design of farm structures. Its aim is to teach the student drawing so that he can make plans for his own buildings; estimate his bill of material, costs, and see the finished structure before it is built. Framing and wood construction, concrete and cement construction. Other building materials: brick, hollow tile, stucco, stone, taking of quantities, specifications, structures and their requirements. The farm house and its accessories. Maps and topographic drawing. Conventional signs. Map drawing from notes taken from surveys. Each student is obliged to lay out a farm with all its accessories and make a complete list and set of plans for a country home.

[Three hours per week for one term. Prerequisites: Courses one and six.]

10. Agricultural Engineering. This course takes up the study of the principles of agricultural surveying, map making, computing areas, and leveling practice. The principles of farm drainage, laying out of the drainage system, capacity of tile drains, land drainage and the construction of tile drains. Irrigation, supplying water for irrigation. The construction and maintenance of roads, sand, clay, gravel and other types. Culverts and bridges, laying out the farm and location of farm buildings.

[Two hours per week for one term.]

11. Farm Structures. This course embraces the study and practice of farm structures such as: horse and dairy barns, sheep barns and sheds, poultry houses, corn houses and cribs, dairy houses and creameries, spring houses, root cellars and buildings of various kinds. Farm houses and barns and various buildings are built direct from blue-prints by students on a small scale. This course also embraces actual work out-of-doors whenever possible. Prerequisite: Course seven.

[Four hours per week for one term.]

12. Agricultural Surveying. This course comprises the whole theory of land surveying and leveling, the use and adjustment of transit, compass, level and plane table, methods of measuring, relocations of boundaries, supply omissions, obstacles to measurements, computations, field notes and plots, laying out land, parting of land, dividing up land and public survey.

[Two hours per week for one term.]

13. Farm Equipment. This course deals with farm equipment and farm sanitation. Laying out the farm, location of farm buildings, construction of the farm house, the barn, silo, lighting and heating the farm home, sewage disposal for country houses, the septic tank. Sources of farm water supply, plumbing for the country house, pumps and their operation, windmills. Ventilation of farm buildings.

[Two hours per week for one term.]

14. Farm Mechanics. This course takes up the study of the principles of mechanics, materials of construction, efficiency of machines, power transmission, erecting line shafting, babbiting and fitting bearings, belts and belting and forms of transmission.

[Two hours per week for one term.]

15. Gas Engines and Tractors. This course embraces a detailed study and operation of various gas engines and tractors. The combustion chamber, part and valve system, engine speed regulation, setting up engines, the fuel supply, lubrication, elimination of engine troubles, selecting and operating the engine. The traction engine, operating the tractor, modern power applications. Scales and other apparatus are used in testing the engines.

[Two hours per week for one term.]

16. Farm Blacksmithing. This course takes up the study of the various grades of iron and steel. Forging and tempering steel tools, welding, calculation ot stock and the making of general forging. Annealing, case-hardening, brazing and plow work.

[Four hours per week for one term.]

17. Farm Machinery. A study of farm machinery its care, operation and adjustment. Setting up and taking apart grain binders, corn harvesters, corn planters, plows, cultivators, etc.

[Two hours per week for one term.]

18. Forging and Repair Work. This course takes up the study of advanced forging, steel forging and tempering. Duplicate work. Pipe fitting, soldering sheet metal, horse shoeing, repairing and mending harness. Students are required to make actual repairs on broken farm machinery and place them in good running order.

[Four hours per week for one term. Prerequisite: Course 16.]

19. Thesis. To be original work upon some subject taken in Farm Mechanics. Eight hours per week for one term.

HORTICULTURE

1. General Horticulture. A few of the important principles of fruit culture, with definite facts as to the home orchard; location; planting; tillage; fertilizers; spraying; pruning; protection; propagation and renovation of old orchards. Attention will be given to the business side of fruit growing; harvesting; advertising and marketing. The aim is to give the student interested in horticulture, specific knowledge of the fruit industry.

[First semester. Two hours recitation. Laboratory of two hours.]

2. Orchard Management. Management of commercial orchards; locations and soil adapted to the orchard; pruning; spraying; harvesting; grading and storing. Laboratory work will consist of pruning and making spray mixtures.

[Second semester. Two hours recitation. One laboratory of three hours.]

3. Systematic Pomolology. This course consists of identifying and describing the various types of fruits, such as apples, grapes, peaches, pears and all orchard products. Students will be required to make a field trip through the great Michigan fruit region.

[First semester. Two hours recitation. One laboratory of two hours.]

4. Small Fruits. Culture, harvesting, marketing of grapes, raspberries, currants, gooseberries and other small fruits. During the growing season trips will be made to the Michigan Grape growing region a few miles north of the University.

[Second semester. Two hours recitation. One laboratory of two hours.]

VEGETABLE GARDENING SERIES

1. Vegetable Gardening. A study of the principles of vegetable growing for home and market. Planning and care of the garden, cultivation, fertilizers and manures, varieties of vegetables, construction and management of hot beds and cold frames, seed sowing, transplanting, harvesting, and marketing are fully considered. Special emphasis will be placed on food conservation in this course. Practical demonstration will be given in the canning of all kinds of vegetables and garden fruits. The laboratory has been equipped with modern facilities for canning both in glass and tin.

[Second semester. Two hours recitation. One laboratory of two hours.]

2. Vegetable Forcing. This course consists of growing of lettuce, radish, tomato plants under glass. A commercial vegetable house 100x25 will be devoted to this work.

[First and second semester. One hour recitation. Three laboratories of six hours.]

3. Truck Farming. Practical commercial growing of all truck crops. Students in this work will be given an opportunity to study various crops, such as potatoes, onions, cabbage, celery and other truck grown both upon muck and sandy soils. Students will make trips to the famous Kalamazoo celery region.

[Second semester. Two hours recitation. One laboratory of two hours.]

LANDSCAPE GARDENING AND FLORICULTURE SERIES

1. **Garden Flowers and Landscape Materials.** In this course students will become familiar with the selection and management of flowers and shrub used in landscape design, annuals perenials, bulbs, bedding plants, roses and shrubbery.

{First semester. Two hours recitation. Two laboratories of four hours.]

2. **Commercial Floriculture.** Propagation, bedding and growing flowers for the trade. Students will visit modern greenhouse establishments in this vicinity.

[First or second semester. Two hours recitation. Two laboratories of four hours.]

3. **Landscape Design.** This course is designed for the individual needs of the student and for those looking forward to specializing in landscape work. The principles of landscape are studied and described. Practical design, home grounds, suburban properties and city problems. Students will work up original problems and make the necessary drafting.

[First semester. Two hours recitation. Two laboratories of four hours.]

4. **Farm and City Forestry.** Students in this course will become familiar with all the forestry trees found in this section. They will be studied from economical value and as shade trees. The planting and care of shade trees will receive special emphasis.

[First semester. One hour recitation. One laboratory of two hours.]

5. **Marketing of Horticulture Products.** This course is designed to give the student a knowledge of

the best methods of advertising, packing, shipping, marketing and displaying horticulture products.

[First semester. Two hours recitation. One laboratory of two hours.]

6. Special Problems. To be arranged to meet the needs of the student in Fruit Growing, Small Fruits, Vegetable Gardening, Floriculture or Landscape Design.

[Open only to seniors and post graduates.]
[16 hours elective.] ,

ANIMAL HUSBANDRY AND DAIRYING

1. Stock Judging. In the course the students are made familiar with the various types of horses, cattle, sheep and swine. Animals representing the different types and breeds are brought before the class and practical work of judging is supplemented by the use of lantern slides connected with lectures.

[Second semester. Two hours recitation.]
[One laboratory of two hours.]

2. Feeding of Animals. The digestion of food; composition and digestibility of feeding stuffs; preparation of feeds; feeding standards and calculation of rations; the feeding of horses, beef, dairy cattle, sheep and swine.

[First semester. Two hours recitation.]
[One laboratory of two hours.]

3. History of Breeds. This course consists of the study of the origin, history, characteristics and adaptability of the breeds.

[First semester. Three hours recitation.]

4. Pork Production. This course comprises a study of the economical methods of growing, fitting and finishing hogs both for breeding and fattening for market. The laboratory work includes feeding, management and housing of hogs.

[First semester. Two hours recitation.]
[One laboratory of two hours.]

5. **Advanced Stock Judging.** Judging of market classes and pure breed stock. The student is particularly adapted for judging at fairs and live stock expositions. Students will prepare stock for exhibition.

[First semester. One hour recitation.]
[Two laboratories of four hours.]

6. **Sheep Raising.** Economic methods of growing, fitting and finishing sheep for market, as well as the economic management of sheep for breeding purposes.

[Second semester. Two hours recitation.]
[One laboratory of two hours.]

7. **Live Stock Marketing.** A study of the art of marketing live stock and live stock products, freight and insurance rates in transit, liability of carrier and shipper, terminal charges, commissions on sales or storage.

[Second semester. Three hours recitation.]

8. **Meats.** This is a course in killing, dressing, cutting and curing of meats.

[First semester. One hour recitation. One laboratory of two hours.]

9. **Stock Breeding.** Theoretical and practical application of the law of breeding, study of experiments on inheritance and variations.

[Second semester. Three hours recitation.]
hours credit.]

10. **Diseases of Live Stock.** This course comprises the study of the various diseases of live stock; their

care, treatment and remedy. Whenever material is available, students will make observation of diseases of animals.

[First semester. Five hours recitation.]
[Laboratory to be arranged.]

11. Poultry Husbandry. This is a general course in poultry devoted to the best methods in maintaining poultry, breeds of poultry, housing, diseases, sanitation and marketing.

[Second semester. One hour recitation.]
[One hour laboratory.]

12. Elements of Dairying. This is a general course in dairying, dealing with secretion, composition and properties of milk, with the factors influencing its quantity and quality, and the care of milk and cream upon the farm. Study of the construction and operation of cream separators, the principles and application of the Babcock tests, use of lactometer and butter making upon the farm.

[Second semester. Two hours recitation.]
[Two laboratories of four hours.]

13. Buttermaking and Creamery Management. Creamery butter making, construction and care of creameries, method of sampling and grading cream, pasturization, cream ripening. Creameries and dairy stations will be visited and studied.

[First semester. One hour recitation.]
[Two laboratories of four hours.]

14. Ice Cream. Special courses in ice cream making, ices and the handling of a commercial ice cream plant.

[First semester. Two hours recitation.]
[Four hours laboratory.]

15. Elective. Special problems in Pork Production, Stock Raising, Feeding, Dairying or Poultry.

Open to seniors and graduates.

[Sixteen hours credit.]

ARCHITECTURE

HISTORY OF ARCHITECTURE

1 (a). Ancient and Classic Architecture. The work of the ancient Egyptians, Babylonians, Greeks and Romans to the reign of Diocletian.

1 (b). Medieval Architecture. A study of the development of architecture from the fifth to the fifteenth century. Mosaics, sculpture, stained glass and iconography are studied in relation to the architecture of this period.

[Three hours a week for one term.]

2 (b). Renaissance. A study of the Humanist movement of the fifteenth century in Italy, the Renaissance in France and England. French and Italian landscape architecture.

2 (b). Modern. The Gothic and classic revivals; national traditions and taste in Europe during the nineteenth century; modern German architecture; European and American city plans and park systems; colonial architecture in the United States. European influence in America.

[Three hours a week for one term.]

HISTORY OF ART

3 (a). History of Painting. A study of the great periods in the various schools of painting from the Renaissance in Italy to the present time.

[Two hours a week for one term.]

3 (b). History of Sculpture. A study of classic, medieval and renaissance sculpture, especially in its relation to architecture.

[Two hours a week for one term.]

4. Ornament. Color decoration in stained glass and mosaic; tapestries and furniture designs are studied technically and historically.

[Two hours a week for one term.]

CONSTRUCTION

In all courses in construction students are required to draw a series of plates illustrating the methods of making working drawings and to become acquainted with the typical forms of construction.

1. Construction. The first year work covers the ordinary building trades where extensive calculations are not involved. Building materials, masonry, carpentry, roofing, interior woodwork, plastering and painting with the specifications of each trade are studied and working drawings of a simple dwelling are made.

[Three hours a week for two terms.]

2. Steel Construction. Ores and manufacture of iron and steel; theory of beams, designing, detailing and shop work of beams; columns, calculation of single section and built up steel columns, girders, steel frame work for buildings, wind bracing and fireproofing, foundations, soils and piling.

[Three hours a week for one term.]

3. Re-inforced Concrete. Floor slabs, beams, girders and columns.

[Three hours a week for one term.]

4. **Heating and Ventilation.** Theory and practice of heating and ventilating buildings.

[One hour a week for one term.]

5. **Sanitation.** Water supply and purification; sewage disposal; plumbing of buildings.

[One hour a week for one term.]

6. **Graphical Statics.** Anaytical and graphical statics; analysis of stresses in trusses, design of roof trusses.

[Two hours a week for two terms.]

7. **Professional Practice.** Laws affecting clients and architects; building laws, professional ethics.

[One hour a week for one term.]

DESIGN

1. **Elements.** A technical detailed study of the construction and appropriate use of walls, openings, the five orders of Vignola, arches, vaults, roofs, by means of carefully drawn and rendered plates and the use of these elements in simple problems in design.

[Eight hours a week for two terms.]

The study of design is conducted by means of problems and criticisms. The problems vary in length from sketch problems, requiring only a few hours for their solution to major problems requiring four weeks or longer.

With each problem is given definite requirements such as might be imposed by a client. After the various studies are made and the drawings presented they are marked and criticised by the instructor.

These courses are divided as follows:

2. Problem in composition involving the use of elements studied in the first year.

[Eight hours a week for two terms.]

3. Problems in composition requiring the studying of plans.

[Eight hours a week for two terms.]

4. Larger architectural composition including interior decoration and landscape design.

[Ten hours a week for two terms.]

5, 6. Structural Design. These courses have the same relative importance as the courses in design..The analogy goes further, the work is given as major and minor problems of varying degrees of difficulty and is judged and marked in the same manner. The scope of the problems will vary from the making of an ordinary footing plan to the framing of the structural steel of a large dome.

[Eight hours a week for four terms. Ten hours a week for two terms.]

7. Theory of Planning. The study of the requirements of different groups of buildings: **(a)** Domestic buildings; **(b)** Ecclesiastical planning in relation to service. **(c)** Hospitals, schools, libraries, public buildings.

[One hour a week for one term.]

8. Architectural Drawing. Exercises in instrumental drawing, pencil and brush work and lettering, followed by problems in orthographic projections, intersections, shades and shadows and perspective with particular reference to architectural subjects. Freshman year.

[Two hours a week for two terms.]

Senior Thesis. In the second term of the senior year the student must work out a thesis design for a large architectural group including details.

ASTRONOMY

1. Astronomy. A descriptive course, including the fundamental principles of Astronometry, Astrophysics and stellar Statistics. Presentation of the leading facts respecting the sun, moon, planets, and comets. Astronomical instruments and corrections to astronomical observations. Celestial Mechanics. Constellation studies and telescopic examinations of the heavenly bodies. Selected problems with the celestial globe and the equatorial telescope. The observational work at the Observatory in connection with this course will be varied to suit the needs of students from the different departments.

[Three hours a week for one term.]

2. Astronomy. Practical. This course is designed to meet the requirements of Civil Engineering students and to give them the training and information necessary for intelligently executing certain departments of work to which they may be assigned in the course of their professional career. The course comprises a study of astronomical instruments as well as instruments of more precision than those used in ordinary surveying. The adjustments and use of these instruments are considered, and instruction is given in methods of observation and computation; different methods for finding latitude, longitude and time are studied in detail, and the methods for finding the right ascensions and declinations of heavenly bodies; methods of making observations and their adjustments, and discussion of errors. Conversion of solar time into sidereal, and sidereal time into solar.

A Course in Least Squares is given with Practical Astronomy and comprises a study of a review of the theory of probability; errors and their probability, the probability curve, and probability integral; also the solution of observational equations, average error, mean error, approximate formulas and propagation of errors; normal equations and formulas fitted to observations.

[Three hours a week for one term.]

BACTERIOLOGY

Lectures and Laboratory Work. Lectures on the form, structure, reproduction and classification of bacteria. The relations of bacteria to disease, etc. The principles of sterilization, thermal and chemical, are pointed out. The early part of the laboratory work is occupied in the preparation of the various culture media and in studying pure cultures of certain non-pathogenic bacteria in these media. Observations on the microscopic characteristics of bacteria and special attention to the microscopic technique in bacteriological work. Later on in the course some time is devoted to practice in the isolation and identification of pathogenic germs by the various staining processes. Bacteriological investigations of water, air, soil and milk.

[Four hours a week for one term.] ,

Immunity. An elementary course, designed especially for teachers of bacteriology who wish a deeper insight into the nature of immunity phenomena. A good knowledge of bacteriology is required.

Aggressins, bacterial poisons, phagocytosis, opsonins bacteriotropins ,alexins, cytolytic endolysins, cytolysis etc.

A study of facts and theories concerning the allergen-antibody interaction, the mechanism of anaphylaxis, etc.

[Four hours a week for one term.]

BIOLOGY

This is an introductory course designed to acquaint the students with the important problems of biology. It is intended to meet the needs of those who, acquiring such foundations, wish to pursue more advanced work in Zoology or Botany. It is a complete elementary course for general students who wish to familiarize themselves with the fundamental facts of the structure and function of living things. Students may take the lectures and recitations without the laboratory.

1. **Plant Biology.** Lectures and recitations. Study of the parts of a typical vegetable cell and its division. The chemistry and physical properties of protoplasm. Habitat, morphology, structure and reproduction of some unicellular plants, e. g., algae, yeasts, bacteria, etc. Special study is made of the morphology, histology, and reproduction of typical fern and flowering plant. Brief discussion of some of the laws and theories advanced on the subject of heredity.

[Four hours a week for one quarter.]

2. **Plant Biology.** (Laboratory). Supplementary to the theory of 1. Drawings are made of all specimens studied. A typical vegetable cell is studied both unstained and stained and also the direct cell division and all the stages of mitosis. Microscopical examination of vegetable tissues. Algae, yeasts and bacteria

are also studied. Students are taught the methods used in killing, fixing, embedding and staining of tissues.

[Four hours a week for one quarter.]

3. Animal Biology. Lectures and recitations. A discussion of the doctrine of spontaneous generation. Structure of living things; protoplasm and the cell. Spermatogenesis, oogenesis, maturation and fertilization as well as segmentation of the ovum and the formation of the germ layers. The subject of heredity is treated as proposed by Weissmann, Mendel, de Vries, and others. A study is made of selected types of invertebrates comparing same with some of the vertebrate types, thereby illustrating from the standpoint of function and ontogeny the phylogenetic relationships of different phyla. An exhaustive study is made of a representative animal of some complexity to illustrate better vital phenomena.

[Four hours a week for one quarter.]

4. Animal Biology. (Laboratory). Supplementary to the theory of 3. Drawings are made of all specimens studied. Practical lessons in the use of the miscroscope. Examination of frog's blood, fresh and stained. Studies of the animal cell and the fundamental physiological properties of protoplasm as manifested in unicellular animals e. g., amoeba, paramoecium, etc. Stages in the cleavage of the ovum of the sea-urchin. Study of ciliary action, muscular contractility, effects of temperature, etc. An exhaustive study of a representative animal e. g., the earthworm (*Lumbricus terrestris* (*L.*)) which is usually taken as a type.

[Four hours a week for one quarter.]

BIONOMY

This course aims to meet the needs of those students who desire to obtain some knowledge of the biological phenomena as part of their general education.

Sex-determination, sex-linked characters, and the elementary principles of variation and heredity are treated and their applicability noted.

[Four hours a week for one term.]

BOTANY

General Morphology, including the following:

1. (a). Ontogeny and Phylogeny. Comparative study of the life histories and method of development of the typical and important specimens of the plant phyla, with reference to taxonomic relationship and variation, habit, etc. Special reference works, Coulter, Barnes, Cowles Vol I. Text, Gager and special notes.

[Two credit hours.]

1 (b). Cytology. Study of the vegetable cell, its structure and activities, karyokinesis, especially that of cormophyta and its variations, reduction division; stages af haploid and diploid mitosis, cell products, etc.

1 (c). Histology. Different kinds of (1) plant tissues and tissue systems; (2) special histology of typical plants. Notes and unpublished text of Dr. J. A. Nieuwland, C. S. C.

[Two credit hours.]

1 (d). Organography. Lectures and recitations on the development, variations, gross structure, terminology of plant parts and organs, root and shoot, with special reference to spermatophyta. Discussion of their processes of pollination and fertilization. This course is designed as preparatory to 2(d) and 4 (b). S. C.

Special unpublished text of Dr. J. A. Nieuwland, C.

[Two credit hours.]

Laboratory work supplementary to Course in General Morphology in its various subdivisions.

2 (a). Microtechnique and study of plants discussed in Course 1 (d).

[One credit hour.]

2 (b, c). Examination of various tissues, cells, parts of typical plant structures from freehand sections or prepared slides.

[One and one-half credit hours.]

2 (d). Plant analysis and termination. Typical phanerogamic plants are studied taxonomically. Special attention is paid to phytography and exact description by student. Text: Gray's Manual or some Regional or Local Flora, Bergen. Use of the University plant-description folders. Determination of pharmaceutical and medical plants. Special study of weeds and forage plants for students of agriculture. Preparation of herbarium. Work minute and careful. 26 plants. Prerequisite 1 (d).

[One and one-half hours credit.]

3. Advanced Botany. Lectures, recitations, demonstrations. The work of this course is essentially the same as that laid out in Strasburger's or Vine's textbook of Botany. Special study is made of the physiology, ontogeny, phylogeny, ecology and classification of plants. Special notes by the professor.

[Three hours a week for two terms.]

4. Laboratory for Advanced Botany. Supplementary to Course 3, and either following or accompanying it.

4 (a). Advanced Plant Histology and Physiology. Half of the time alloted for laboratory work is devoted to plant histology and physiology. The student is required to study practically the method of killing, fixing, embedding, sectioning, staining, mounting and drawing of plant tissues. Prerequisites 1 (a), 1 (c), 2 (a, b, c).

4 (b). Plant Classification Advanced. The other half of the laboratory work is devoted to the determination and classification of the more difficult plants to analyze, the compositae, grasses, mosses, myxomycetes, etc. Herbarium study is required, as well as preparing and collecting plants for preservation. During spring and autumn frequent excursions into the neighboring fields and woods are made for the purpose of studying and collecting for preservation the local aquatic and land flora. Prerequisites 1 (d), 2 (d).

[Three hours a week for two terms.]

5. Systematic Botany. Principally laboratory and herbarium work in special groups of phanerogams and cryptogams. Study of nomenclature and classification of plants. This course is designed to meet the needs or inclinations of students specializing in botany. Library research, reference books and seminar work.

6. Botany. A special course adapted to students who use botany as a major for B. S. (Botany). The work consists in the study of some special problem in various branches of the science, and in connection with the subject of the thesis. It includes seminar work and bibliography. Library research.

[Two hours a week for one term.]

7. Botany. History of Botany—The study of the epoch making books and authors of the science. Lectures supplemented by themes from students.

Graduate Work in Botany. (a) Original research in systematic botany. (b) Plant histology and cytology. Preparatory to the Master's or Doctor's Degree.

CHEMISTRY

1 (a). General Chemistry. A minor course dealing with the general principles of chemistry and embracing a study of only the commoner elements and their typical compounds.

[Two hours a week for one term.]

1 (b). A Laboratory Course covering in the laboratory the work of Course 1 (a) and designed to accompany it.

[Two hours a week for one term.]

2. Advanced General Chemistry. Lectures and recitations. A complete study of the elements and their most important compounds, following the classification based on Mendeleeff's Law, and including a discussion of the theories of the science.

[Four hours a week for one term.]

3. Qualitative Analysis. A Laboratory course to accompany Course 2. The work consists in the study of reactions and methods involved in the separation and determination of the more common inorganic ions. These are examined not only in simple salts but later in complex mixtures such as ores, slags, alloys and commercial products. The student is expected to include in his report not only his qualitative results but the proximate amount of each element or iron present. One hour lecture or recitation with four laboratory hours.

[Four hours a week for one term.]

4 (a). Qualitative Analysis. A course arranged for the students in Pharmacy and Agriculture, comprising a study of the commoner metals and acids, their reactions and separation. Lectures and laboratory.

[Five hours a week for one term.]

4 (b). Quantitative Analysis. A course suited to the needs of the students in Pharmacy and Agriculture, comprising the determination of substances, both gravimetrically and volumetrically. Complete analysis of many complex substances. Lectures and recitations.

[Five hours a week for one term.]

5. Quantitative Analysis. A laboratory study of the principles involved in the quantitative separation and estimation of substance, both gravimetrically and volumetrically. Complete analysis of a number of simple salts, like barium chloride, with partial analysis of many complex substances. Lectures and recitations.

[Four hours a week for two terms.]

6 (a). Elementary Organic Chemistry. Lectures and recitations. A systematic study of the acyclic compounds and their derivatives and the investigation of their properties, reactions and relationships.

[Three hours a week for one term.]

6. (b). Elementary Organic Chemistry. The study of the cyclic organic compounds, both homocyclic and heterocyclic. Special attention will be given to dyes, alkaloids and other commercially important organic substances. Text, Gatterman and special notes by the professor.

[Three hours a week for one term.]

6. (c). Experimental Organic Chemistry. (Elementary). A laboratory course accompanying Course 6 (a) and 6 (b). The work consists in the preparation of typical organic compounds of the alkyl and aryl groups with special reference to the standard classical reactions such as Fittig's and Skraup's synthesis, Grignard's Friedel-Craft's, Hofmann's reactions etc. The experiments are selected rather to give to the student facility in handling apparatus and preparatory experience for the industrial preparation of compounds. (A reaction may involve more than one actual experiment. Sixteen standard reactions required.) Text, Gatterman and special notes by the professor.

[Three laboratory hours a week for one term.]

7 (a). Urine Analysis. A course of laboratory exercises in the methods employed in the detection and estimation of the constituents of urine, pathologic as well as normal.

[One hour a week for one term.]

7 (b). Toxicology. Symptoms and treatment of poisoning. A chemical and physical examination of the common poisons to familiarize the student with their properties. Attention is also given to their separation from food and animal tissue.

[Two hours a week for one term.]

8. Technical Chemical Analysis. A course in methods commonly used in the testing and analyzing of oils, fats, gas, water, commercial products, such as soap, paper, rubber etc. Besides using standard texts the student is required to try out methods as suggested in current literature.

[Five to fifteen hours a week for two terms.]

9 (a). Advanced Organic Chemistry. An advanced course, intended for students specializing in Chemistry. Lectures, recitations and discussions of special subjects of organic chemistry, synthetic chemistry, isomerism, and stereochemistry. Text-books and special reference works.

[Three hours a week for two terms.]

9 (b). Advanced Organic Laboratory. The time is spent in the making of organic preparations by methods demanding special care, skill and accuracy in the student. Classical reactions.

[Six to eight hours a week for two terms.]

10. Advanced Organic Laboratory. This course is for students in Chemistry and Pharmacy. Ultimate organic analysis, (1) qualitative and (2) quantitative; analysis of carbon, hydrogen, the halogens, sulphur and nitrogen in organic compounds by the various methods.

[Six to eight hours a week for one term.]

11 (a). Electro-Chemistry. Lectures and recitations on the principles of electro-chemistry and their application in the chemical industries, separation of metals, the preparation of chemical elements and electro-synthesis of compounds.

[Two hours a week for one term.]

11 (b). Electro-Chemical Laboratory. A laboratory course accompanying Course 11 (a). Experiments demonstrating the laws and principles of electro-chemistry electrolysis, electro-synthesis and electro-metallurgy.

[One hour a week for one term.]

11 (c) Electro-Chemical Analysis. A laboratory course for those who have completed 11 (a) and 11 (b). Quantitative determination and separation of metals and anions electrolytically using stationary and revolving electrodes, the mercury cathode and their combinations.

[One hour a week for one term.]

12. History of Chemistry. The subject is divided into topics and epochs of special interest in the development of chemistry as a science. These are discussed at length, together with the biographies of the men who aided in their development. Lectures and recitations. Seminar and journal work for advanced students. Text-book; reference to chemical periodicals.

[Three hours a week for one term.]

13. (a). Theoretical and Physical Chemistry. Lectures and recitations. A discussion of chemical theories, the molecular weights of gases, chemical equilibrium, electrical conductivity of solutions, light and heat.

[Three hours a week for one term.]

13 (b). Laboratory work to accompany 13 (a). Vapor density methods, calorimetric determinations, molecular weight calculations by the Freezing and Boiling point methods, the use of the polariscope, spectometer, refractometer, etc.

[One hour a week for one term.]

14. Industrial Chemistry. Lectures, recitations and laboratory work. The consideration of chemical manufacture, fuels, etc., and the preparation in the laboratory of chemically pure substances, organic and inorganic. Special reference books and journals.

[Three hours a week for two terms.]

15. Advanced Quantitative. Mostly laboratory work in special methods of gravimetric and volumetric determinations of inorganic substances. Special reference work.

[Five hours a week for one term.]

16. Physiological Chemistry. Lectures, recitations, and laboratory. This course includes the study of the chemical properties of fats, carbohydrates and proteids; digestive secretions and their actions; quantitative and qualitative examination of milk, gastric juice, bile, saliva, etc.

[Three hours recitation and three laboratory hours a week for one term.]

17. Food Analysis. A laboratory course with lectures on foods and food products, a study of preservatives and methods of preservation together with the legal aspect of such preservation.

[Three hours a week for one term.]

Research Work. Special facilities are offered to graduate students desiring to do original research work in chemistry, preparatory to the Master's or Doctor's degree.

CHRISTIAN DOCTRINE

All Catholic students are obliged to attend the courses in Christian Doctrine. The text used is the Exposition of Christian Doctrine by a Seminary Professor. Courses, 1, 2, 3 are prescribed.

1. Moral.

2. Worship.

3. Dogma. Important questions of Church History will be discussed in this course.

Sacred Scripture. There will be selections from the Bible for each course, so that the whole Bible will be read in the three years' course.

4. Advanced Work in Christian Doctrine. Special questions. This is an elective course.

5. Church History. An elective course for those who desire a more extended and a more detailed presentation than is given under Course 3.

CIVIL ENGINEERING

1. Surveying. This course comprises the whole theory of land surveying and leveling; the use and adjustment of the transit, compass, level, and plane table; methods of measuring; relocations of boundaries; supply omissions; obstacles to measurement; computations; field notes and plots; laying out land; parting off land; dividing up land; public land survey.

[Two hours a week for one term.]

2. Surveying, Field practice and application of theory; adjustment and use of instruments in the field; solution of problems in the field, the theory of which is taught in the class room; practice in keeping field notes; computation and plots. A Summer Course, at the end of the freshman year for Civil, Industrial, and Mining Engineering students. Fifty actual hours.

[One hour a week for one term.]

3. Surveying. This course is a more complete treatment of the theory of Surveying than Course 2. It treats of the adjustment, use, and care of all kinds of engineering instruments; problems pertaining to solar attachment; topographical surveying with the transit and stadia; Hydrographic surveying which comprises a study of the methods of making soundings and locating the same; the use of bench-marks, guages, and water levels; stream measurements, methods and instruments used. City surveying, including a study of re-surveys, topographic surveys, city plan, location of streets, width of grades, field notes, indexing and records.

[Six hours a week for fourteen weeks.]

4. Surveying. Exercises in the field in the adjustment and use of engineering instruments; stadia and plane surveying in the fields, leveling; practice in hydrographic surveying. Summer Course at end of sophomore year. Fifty actual hours.

5. Geodesy. This is an elementary course prescribed for Civil and Mining Engineering students and comprises a study of the instruments and methods of observation, base measurements and field work of the triangulation; methods of least squares, elementary course; calculation of the triangulation, the theory of probable errors; geodetic latitudes, longitudes, and azimuths. This is followed by a brief discussion of the figure of the earth.

[Six hours a week for four weeks.]

6. Railroad Surveying. This course comprises all the theory pertaining to reconnoissance and preliminary surveying for a railroad, theory and maximum economy in grades and curves; location of curves by deflection angles and offsets; obstacles to location of curves; special problems in curves; theory of compound curves; turnouts and crossings; curving the rail on curves and elevation of outer rail; easing grades on curves; vertical curves; earthwork and prismoidal formula; theory of excavation and embankment; correction in excavation on curves; cross-section leveling; theory of the transition curve and practical applications.

[Six hours a week for one term.]

7. **Railroad Surveying.** Exercise in the field; staking out and running tangents, simple ,compound and transition curves; execution on the ground of many problems previously treated theoretically; survey for a short line of railroad, leveling, cross-section work, and setting slope stakes; making profiles and maps; calculating the necessary excavation and embankments and cost of construction; culverts. Summer Course at end of sophomore year. Fifty actual hours.

8. **Descriptive Geometry.** In this course are considered problems on the point, right line, and plane; single curved, double curved, and warped surfaces; problems relating to tangent planes to single curved, double curved and warped surfaces; intersection of surfaces; spherical projections, orthographic, stereographic; globular, cylindrical, and conic projections; construction of maps, shades and shadows; linear perspective; isometric projections; theory and plates. Numerous practical problems and exercises requiring the application of the principles of Descriptive Geometry are added by the instructor.

[Four hours a week for two terms.]

9. **Applied Mechanics.** The course comprises a study of the fundamental principles of statics, kinematics and kinetics. The subjects selected are studied with the object of thoroughly preparing the engineering students to pursue the technical and practical branches of their respective courses. Some of the topics considered in this course are: work, energy, conservation of energy; power, composition and resolution of forces, center of gravity, center of mass,

moment of inertia, acceleration, dynamics of rigid bodies, laws of friction, etc.

[For Civil Engineering Students, five hours a week
for the first term. Three hours a week
for the second term.]

[For Students in Electrical, Mechanical, Chemical,
Mining, and Industrial Engineering,
five hours a week for one term.]

10. Applied Mechanics. This course is intended to meet the requirements of engineering students, and to prepare them, by study of the action and effect of forces on beams and structures, to design economically and intelligently the parts entering into a complete structure. The course comprises a study of the elastic and ultimate strengths and ultimate deformation of the materials of engineering, their properties and methods of testing, and discussion of cases of simple stresses. The general theory of beams including cases of simple and cantilever beams, overhanging, fixed and continuous beams is thoroughly investigated. Columns are examined according to Euler's, Rankin's and other formulae, and results compared. Some of the other subjects considered in this course are torsion of shafts, the transmission of power by shafts, apparent combined stresses, such as flexure and compression, flexure and torsion, etc. Compound columns and beams, reinforced concrete beams, plate girders and other forms. Then is studied the subjects, resilience and work, impact and fatigue, true internal stresses, centrifugal tension and flexure, unsymmetric loads on beams, the course closing with a study of the mathematical theory of elasticity.

[For students of Civil Engineering, five hours a week for one term.]

[For students of Electrical, Mechanical, Mining, Industrial, and Chemical Engineering, three hours a week for one term.]

11. Roads and Pavements. This course is intended to familiarize the student with the practical details of laying out and constructing highways, the method of drainage, grading, and most suitable road covering, the improvements of streets in cities and materials used for paving and covering. The manner of preparing the street before paving is placed in position is fully considered and illustrated. The course includes a thorough discussion of the theory of pavements and a description of the various materials used, such as cobble and stoneblock, asphalt, brick, wood and broken stone pavements. The method of preparing plans and specifications for the various conditions arising is considered and original plans are prepared by students. Attention is also given to the construction of street-car tracks in paved streets.

[Two hours a week for one term.]

12. Engineering. This course is taken by students of Civil Engineering in the Senior year and teaches the best approved methods of constructing engineering works and the styles of structures suitable for different localities. The study is quite comprehensive, including the general theory of the arch and application of the voussoir arch; the theory of earth pressure, and the design of retaining walls; foundations suitable for structures of various classes in connection with which the student becomes acquainted, not only with the methods for ascertaining the bearing power of the foundation, but also the means for constructing deep foundations. The methods for tunnel construction, irrigating canals, river improvements, are included in the course and given by text-book and lectures. The part pertaining to masonry construction includes a study of the properties of stone, brick, mortar, the manner of testing foundations under water, the crib and open caisson process, the pneumatic process, the theory of masonry arches and design, arch centers, selection of site for bridge piers and arrangement of spans, the details of construction of bridge piers and manner of location, specifications for masonry, etc.

[Five hours a week for two terms.]

13. Sanitary Engineering. This course is a study of the principles and methods of drainage and disposal of sewage in populous districts: shape, material and calculation of sewers; catchbasins, flushing and ventilation; separate and combined systems compared; pollution of rivers; chemical precipitation; results and costs of purification; general municipal and domestic sanitation; inspection of neighboring works. Methods of assessment and sewer maintenance.

[Two hours a week for two terms.]

14. Bridges and Roofs. This course comprises a study of the different systems of trussed bridges and roof trusses, and the calculation of the stresses produced when loaded in any manner, the weight of the structure and the effect of wind included. Both graphical and analytical methods are used. Besides the various systems of trussed bridges, which are studied in detail, the plate girders, supension bridges, cantilever bridges, draw bridges, and roofs of various designs are given equal attention; the purpose being to familiarize the student with the different forms and enable him to design and to estimate the cost of construction.

[Five hours a week for one term.]

15. Graphic Statics. This course teaches the determination of stresses in framed structures by the graphical method. Shearing forces, bending moments, centers of gravity and moments of inertia are graphically determined by the application of the principles of the force and equilibrium polygons; also the determination of stresses in bridge trusses with parallel chords and with broken chords, caused by uniform loads and locomotive wheel loads; graphical determination of stresses in roof trusses, graphical treatment of the arch symmetrical and unsymmetrical cases, graphical methods of arch ribs of hinged ends, and of fixed ends; stress diagrams; temperature stresses; braced arches; graphics applied to continuous girders. This course is supplemented by full explanations, notes, examples and problems.

[Five hours a week for one term.]

16. Applied Mechanics. Hydromechanics. This course is a thorough study of the theory of hydrostatics, hydraulics, and hydrodynamics, to which are added many practical exercises. The subjects studied are the transmission of pressures, center of pressures; velocity of flow from orifices of various shapes; fluid friction; Bernoulli's theorem with friction: Chezy's formula; Kutter's formula flow over weirs, and through tubes; flow in pipes; loss of head in friction and other losses; flow in conduits, canals, and rivers, velocities in cross sections; methods of gauging the flow, measurement of water power, dynamic presure of flowing water; designing of waterworks and standpipes; hydraulic motors and relative merits; discussion of water wheels of different types, and a study of the conditions determining high efficiencies; classification of turbines, and a complete study and discussion of the different forms.

[For students in Civil Engineering, three hours a
week for two terms.]

[For students in Electrical, Mechanical, Mining,
Industrial and Chemical Engineering,
two hours a week for one term.]

DRAWING, ARTISTIC

In this department the aim is to lay a thorough foundation in drawing for those who wish to make Art a profession, but the courses are so arranged as to be accessible to other students. The system of teaching, which is that followed in the best art schools, is intended to develop the individuality of each student.

The work is done altogether from casts, objects and nature. The immediate surroundings of the University buildings, the lakes and the Saint Joseph River offer many beautiful subjects for the study of landscapes, and the classes are taken out in the summer for this study.

An excellent collection of casts, some of heroic size, enables the students to study contours and light and shade from the simple geometric figures to the full physical proportions of the human body. The collection embraces:

Full Figure. The Diadumenos (British Museum); the Doryphorus (Naples). These two figures are full size.

The following figures are reduced mathematically the Discobolus; the Venus of Milo; the Slave of Michael Angelo; the Achilles; the Fighting Gladiator (Louvre); and Houdon's Anatomical Figure.

Busts and Heads. Asiaticus (Paris); Brutus (Rome, the Capitol); Cato (Rome and Vatican); Cicero (Rome, the Capitol); Dante (Florence, Uffizi); Agrippa (Louvre); Venus (Vatican); Centurion (Naples); Ariadne (the Capitol); Psyche of Naples (Naples); Vestal (Vatican); Niobe (Vatican); the Two Daughters of Niobe (Florence.)

Among the old busts are the Apollo Belvidere, the Antinous, Bacchus, Juno, Mercury, Demosthenes, etc. Besides there is a complete set of decorative and architectural ornaments, taken from monuments of antiquity, the Middle Ages and the Renaissance, and of elements of the human figure (hands, feet, etc.) from the antique and some anatomical pieces.

1 (a). Form drawing in charcoal. Geometric figures and ornaments in outline. Charcoal drawing from still life. Pencil drawing from still life and nature.

[Five hours a week for one term.]

1 (b). Form drawing in charcoal. Ornamental figures in light and shade. Charcoal drawing from still life. Pencil drawing from still life and nature.

[Five hours a week for one term.]

2 (a). Cast drawing in charcoal. Parts of the human figure in outline. Pencil drawing from still life and nature. Water color painting from still life and nature.

[Five hours a week for one term.]

2 (b). Cast drawing in charcoal. Masks and busts in light and shade. Pencil drawing from still life and nature. Water color painting from still life and nature.

[Five hours a week for one term.]

3 (a). Antique drawing in charcoal. Full figure in outline. Pen and ink drawing from still life and nature. Water color painting from still life and nature.

[Five hours a week for one term.]

3 (b). Antique drawing in charcoal. Full figure, light and shade. Pen and ink drawing from still life and nature. Water color painting from still life and nature.

[Five hours a week for one term.]

4 (a). Antique drawing in charcoal. Groups in light and shade. Life drawing in charcoal. Bust and full figure. Pen and ink drawing from still life and nature. Water color painting from still life and nature.

[Five hours a week for one term.]

4 (b). Antique drawing in charcoal. Groups in light and shade. Life drawing in charcoal. Bust and full figure. Pen and ink drawing from still life and nature. Pen and ink drawing from life. Water color painting from still life and nature. Water color painting from life.

[Five hours a week for one term.]

5. Modeling. In the spring term of the Senior year, for students of Architecture, modeling in clay is taken up. The objects modeled are architectural forms, copied from casts or made from the student's drawings of his own work, as his progress and ability may warrant.

[Two hours a week for one term.]

6. Oil Painting. This course in oil painting includes still life, life, and nature studies.

Special course in outdoor work in the fall and spring, in pencil, pen and ink, water color painting and oil painting.

7. Class of Decorative Design. The object of this course is to prepare students for professional work in decorative designing of all kinds. They will take up the study of historical ornaments and will be taught the several principles of the arrangement of designs, and from personal sketches of plants and flowers will be shown the art of making original designs for wall paper, book covers, stained glass, carpets, interior decorations, metal plates, etc. No particular program is given out as the teaching is purely individual.

8. Freehand. The principles of freehand drawing in pencil and pen from objects, and later from biological specimens, plants, animal and microscopical preparations. For students of Biology.

[Two hours a week for two terms.]

9. Freehand. Advanced drawing from plants and anatomical dissections of animals. Illustrations for publications. For students of Biology.

[Two hours a week for two terms.]

10. Water Color. Drawing in water color from still life and nature.

[One hour a week for one term.]

11. Rendering in Water Color. The rendering of architectural drawings, including perspectives,—casting of shadows, color treatments of buildings and handling of foreground and background.

[One hour a week for one term.]

12. Pen and Ink. Rendering drawings in pen and ink based on studies by noted artists in this branch of art; followed by rendering of original drawings.

[One hour a week for one term.]

13. Teachers' Course. A comprehensive course of studies has been arranged for students wishing to become teachers of Art in the grade schools and high schools. This course may be completed in two years or more and embraces the following subjects: (*a*) Freehand Drawing in Outline. (*b*) Drawing in Light and Shade. (*c*) Plant Drawing and Design. (*d*) Geometrical Drawing. (*e*) Model Drawing. (*f*) Drawing on the Blackboard. (*g*) Drawing Common Objects from Memory. (*h*) Clay Modeling.

A certificate will be given those who successfully complete this course.

[Ten hours a week.]

14. Cartooning and Illustrating. This course is intended for advanced students who wish to follow Press art work as a profession. Caricature, Comic and Political Cartooning, Illustrating and Poster Designing will be taken up and the student will be made familiar with Pen and Ink drawing, Black and White wash drawing, the Grease pencil, charcoal, and color work.

[Ten hours a week.]

DRAWING, MECHANICAL

Elementary Freehand, Lettering, Geometrical Drawing, Elementary Projections are required to take up drawing 1. Students who have not had this preliminary training will have an opportunity to make up this deficiency. *At least thirty hours of actual time in drawing are required for each credit hour in the schedule.*

1. Projection Drawing. This course consists in reading blue prints; freehand sketching with pencil from various models of different machine parts; finding the dimensions and drawings to scale with the use of instruments; the principles of Orthographic Projections.

[Two hours a week for one term.]

2. Projection Drawing. Continuation of Course 1. Making simple mechanical working drawings from freehand sketches, from machine parts, sections, line shadings, tracing, blue printing and the preparations of working drawings of complete machines.

[Two hours a week for one term.]

3. Descriptive Geometry. A series of accurate plates is made illustrating the principles of orthographic and spherical projections. Isometric projections. Shades and shadows and perspective. Prerequisite, Drawing 1 and 2.

[Two hours a week for one term.]

4. Machine Drawing. A continuation of Courses 1 and 2, embracing advanced work in machine drawing; making detail and assembly working drawings from free hand sketches. The elementary principles of mechanical design with calculations of dimensions and construction of drawings from sketch-book notes.

[Two hours a week for one term.]

5. Topography. Pen and colored topographical drawing, conventional signs, map drawing from notes taken from surveys. This course must be preceded by Course 1.

[One hour a week for two terms.]

6. Stereotomy. This course comprises a study of the application of the principles of Descriptive Geometry to the determination of the forms and sizes of the stones used in the construction of the different classes of arches and masonry structures. This course is given by lecture in the drawing room, explaining the construction of templates, and the use of directing instrument; also explanations of methods of drawing plans, elevation and development of oblique arches, wing walls and the like. A certain number of plates and drawings is required, illustrating the methods of performing practical work. Drawing and designing plans, elevations and sections of masonry construction, foundations, dams, piers, abutments, culverts, and arches.

[Two hours a week for one term.]

7. Bridge Designing. This course proceeds from simple framed girders to complete bridge-trusses of various designs,—required of Juniors in Civil Engineering. Complete design of a railroad bridge and detail drawing,—a short general course of bridge designing.

[Two hours a week for one term.]

ELECTRICAL ENGINEERING

1. Applied Electricity. A course of lectures and recitations, supplemented by laboratory practice, on the general theory of electricity and magnetism and its application to practical work, as follows: Setting up and testing primary and secondary batteries, systems of call bells, electric and gas lighting appliances, fire and burglar alarms, telegraph and telephone lines, switch boards and accessories. Experiments with induction coils, magnets, switches, voltmeters, ammeters, Wheatstone bridges, galvanometers and other measuring instruments. The study of direct current generators and motors, arc incandescent lighting systems, street railway machinery and appliances, electric heating and forging, electrolytic process, etc.

[Five hours a week for two terms.]

2. Applied Electricity. Lectures and laboratory work on the construction and testing of switches, magnets, measuring instruments, induction coils, etc. The calculation of sizes of wire and location of circuits for lighting and power, the experimental study of alternating current machinery and accessories.

If the student has acquired sufficient skill in handling tools in his workshop, he may design and build a small dynamo, starting with rough castings, doing all the fitting and finishing, winding and adjusting, and finally testing for insulation, efficiency, and adaptability to special purposes. This course must be preceded by Course 1. (*Courses 1 and 2 are required in the Short Program Electrical Engineering; they are elective for general students and those studying telegraphy.*)

[Five hours a week for one term.]

3. Applied Electricity, Laboratory and Lectures on the use of electricity in buildings, system of wiring, materials used, the Underwriters requirements for the installation of bells and telephones, electric lighting. The principles of photometry and illumination. For students in Architecture.

[One hour a week for one term.]

4. Dynamo Electric Machines. This Course, given in the first term of the Junior year, consists of a detailed study of the laws of magnetism, magnetism of iron, electromagnets, etc., as applied to dynamo electric machines followed by a study of the properties, characteristics and physical reactions of dynamos, the operation of dynamos as generators, the operation of dynamos as motors, power losses in generators and motors, efficiency, ratings and guarantees, supplemented by a collection of special notes and the solution of a large number of numerical problems.

Prerequisite: Freshman and Sophomore Physics and Mathematics.

[Four hours a week for one term.]

5. Direct Currents. This course is a continuation of Dynamo Electric Machines and comprises a thorough study of the practical operation of dynamos, station equipment, storage batteries, characteristic curves, electric distribution and wiring, armature windings, photometry and electric lighting, supplemented with notes and the solution of a large number of numerical problems and laboratory exercises.

Prerequisite: Dynamo Electric Machinery, Electrical Engineering 4.

[Three hours a week for one term.]

6 (a). Alternating Currents. This course is designed to meet the needs of electrical engineering students and comprises a detailed and thorough study of the physical and mathematical relationship of quantities involved in alternating currents, properties of alternating currents, self-induction, capacity, the solution of alternating current circuits, alternators and transformers. The course is largely supplemented with special notes and lectures and the solution of a large number of numerical problems.

Prerequisites: Calculus and Electrical Engineering 5.

[Five hours a week for one term.]

6 (b). Alternating Currents. A special course for students taking the short Program in Electrical Engineering. The same problems are treated as in 6 (a) though in a more elementary form. Trigonometry is a prerequisite.

[Five hours a week for one term.]

7. Alternating Current Machinery. This course, a continuation of 6 (a) involves a detailed and thorough study of alternating current motors, synchronous motors, single phase commutator motors, converters, followed by a course in power transmission. Supplemented with special notes and lectures and the solution of problems.

[Three hours a week for one term.]

8. Problems of Electrical Engineering. A course intended for the solution of the more difficult problems met with in the preceding two courses, given under the direction of an instructor. This course accompanies 6 and 7.

[Two hours a week for one term.]

9. Designing. The designing and making of working drawings of switches, resistance and other electrical apparatus. Calculation of sizes of wire and location of circuits for lighting buildings. Complete drawing of direct and alternating current dynamos. Laying out plants for power and lighting.

[Two hours a week for two terms.]

10. Electrical Laboratory. Practical work at wiring buildings for lights and power, testing circuits for insulation and grounds, construction and operation of storage batteries, management and care of dynamos, characteristic curves of particular machines under different conditions, efficiency, tests of motors by absorption dynamometer methods, alternating current dynamo and transformer tests, the testing of storage batteries, and complete efficiency tests. Careful notes are taken.

[Four hours a week for two terms.]

11. Hydraulic Engineering. This course is designed to equip the students of engineering with the fundamental principles of hydraulics with a view towards their application to the design of hydro-electric power plants. The course consists of lectures, recitations and notes on hydro-statics, hydrodynamics, methods of measurement of flow, recognizance of water power, measurement of power, and materials of engineering.

This course is for the Senior students of Electrical Engineering. Prerequisites: Mechanics and Physics.

[Three hours a week for one term.]

12. Hydro-electric Power Plants. This course is designed to acquaint the student with the construction of hydro-electric power plants involving hydraulic construction in general, power house construction, power house equipment, i. e., water wheels, generators, etc., and power transmission. This course must be preceded by Hydraulic Engineering.

[Three hours a week for one term.]

13. Electric Railways. Lectures and recitations on track and overhead construction, cars, trucks, motors and systems of control for both direct and alternating currents, sub-stations, operation and financial considerations.

[One hour a week for one term.]

14. Telephony. Laboratory and lectures on general principles ,intercommunicating systems, switchboard systems, manual and automatic operation, cost of equipment, maintenance and depreciation.

[Two hours lecture and two hours laboratory
a week for one term.]

15. Radio. Students electing this course should have completed or be taking a fundamental course in alternating currents. The course comprises a study of signaling methods, primary and storage batteries, battery charging, dynamotors, alternating currents of high frequency and radio frequency, systems of radio transmission, radio equipment, vacuum tube receivers, amplifiers and transmitters, sending and receiving antennae, aeroplane communication, and sources of power.

[Three hours lecture and two hours laboratory
a week for one term.]

16. Illuminating Engineering. Lectures on the theory and operation of the various kinds of electric and other lamps, distribution of light and the location of lamps to produce the best illumination, practical problems and the study of particular installations, the cost per candle power or per candle foot including first cost, attendance, breakage and depreciation.

[Two hours a week for ten weeks.]

17. Theory of Alternating Current Machinery. This is an advanced course on the theory of alternating current machinery, use being made of the complex quantity and vectors in the solution of problems. The course is supplemented by a course in Vector Analysis. Textbook, special notes and lectures.

[Three hours a week for one term.]

18. Electrical Engineering Club. The Electrical Engineering Club is an oganization composed of all the electrical engineering students of the University. Assigned papers on electrical engineering topics are presented and discussed. The meetings are under the direction of an instructor. Its purpose, in addition to imparting much useful information, is to give students fluency in speech and writing. Junior and Senior students are supposed to take an active part in the proceedings of the club. Engineers of prominence, not connected with the department, give frequent lectures on highly important electrical engineering subjects. The lectures and proceedings are published in the bulletin of the department. The club meets weekly.

19. Inspection Trips. Study of the larger power, lighting and telephone installation, also factory methods in several typical industrial establishments, trips to the hydraulic and steam generating plants along the St. Joseph river.

Summer Thesis.—Students of the Electrical Engineering Department are supposed to write a thesis, or essay, of not less than one thousand words on some topic assigned to them in their Junior year. This essay will consist of a report on some electrical installations, or actual work performed by the student during the summer vacation.

Graduation. At the beginning of the Senior year the student selects a thesis for investigation and makes the first report on the same to the Director of the Department no later than the beginning of the second semester of the Senior year. By this time the student is supposed to have a clear outline of what he is going to do and to have gathered all the necessary data for the successful working out of his thesis. Reports on the progress of the thesis are then made at regular intervals to the Director of the Department for approval and suggestion. Two typewritten copies of the thesis must be filed with the Director of the Department no later than May 20.

Courses 20 to 24 inclusive are designed for students taking Industrial Engineering.

20. Direct-Current Machinery. A course to establish the principles of electrical and magnetic circuits followed by their application to the theory and operation of direct-current generators and motors.

[Four hours a week for one term.]

21. Prime Movers, Steam. A course for Commercial Engineers only, dealing with the subject of Steam Power Plants, special attention being paid to equipment and selection of units for a specified purpose with calculations for size, adaptability and efficiency. Descriptive study of standard power plants from current technical literature.

[Three hours a week for one term.]

22. Prime Movers, Hydraulic. Those features of hydraulic engineering of special interest to the Commercial Engineer are dwelt upon. Reciprocating and centrifugal pumps, blowers and compressors are studied with their applications to the power plant and industries.

[Three hours a week for one term.]

23. Alternating-Current Theory. A course for Commercial Engineers only dealing with the theory and operating characteristics of transformers, alternating-current generators and motors, synchronous converters and other types of alternating-current apparatus.

[Three hours a week for one term.]

24. Alternating-Current Machinery. A study of the application of electricity in its various fields of usefulness. Selections of equipment for a special purpose with calculations for size, application and efficiency complete the work.

[Three hours a week for one term.]

ELOCUTION AND ORATORY

1. Readings and Declamations. This course is designed to correct defects in pronunciation and emphasis. Each student is required to give two declamations.

[One hour a week for one term.]

2. Readings and Declamations. Continuation of Course 1. Each student is required to give three declamations.

[One hour a week for one term.]

3. Practical Elocution. Exercises in breathing, voice culture and action. The principles of pronunciation and emphasis and their application in the reading of selections.

[One hour a week for one term.]

Practical Elocution. Further exercises in breathing, voice culture, action. Quality, force, pitch, and time. Minute speeches and declamations. Lectures on the principles of action.

[One hour a week for one term.]

5. Oral Discussions. The application of formal logic to debating. Analysis of selected argumentative speeches, and the preparation of briefs. Courses

3 and 4 and a course in logic are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for one term.]

6. Oratory. A study of the great orators of ancient and modern times. Each student is required to write and deliver a biographical oration on one of the great orators. Lectures on methods of public address. Courses 3 and 4, and Course 1 in English are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for two terms.]

7. Shakespearean Reading. The critical and artistic reading of two of Shakespeare's plays accompanied with stage action. The students present the play by scenes before the class. Courses 3 and 4 are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for two terms.]

8. Assembly Work. This course is designed to supplement the other courses in this department. It consists of debates, short orations, minute speeches, declamations, impromptu and drill work in parliamentary law.

[One hour a week for two terms.]

ENGLISH

1. Genung's Principles of Rhetoric. A study of the complete text. Frequent practice in simple theme work; versification; writings in all literary forms and assigned readings.*

[Four hours a week for two terms.]
[College of Arts and Letters.]
[College of Science and Engineering. Three hours a week for two terms.]

2. The Oration. Intensive study. The structure and purpose of the oration. A discussion of the principal orators.

[Two hours a week for one term.]

3. The Essay. Intensive study. The structure and purpose of the essay. A discussion of the principal essayists.

[Two hours a week for one term.]

4. Poetry and the Poets. Texts, theory, and critical study.

[Two hours a week for two terms.]

5. Fiction. The Short Story, technically, historically, and critically considered.

[Three hours a week for one term.]

6. Fiction. The Novel, technically, historically, and critically considered.

[Three hours a week for one term.]

7. The Drama. Historical survey of the drama. Greek and Roman Dramatists. Liturgical, Morality, and Miracle Plays. Technique of the drama. Two credit hours.

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* Every Freshman will be obliged to follow a class in *correct English*, one hour a week, unless his written work gives evidence that he may be dispensed from this special exercise. Any student notably deficient in correct English will be obliged to take this course.

8. **The Drama.** Elizabethan dramatists. Intensive study of Shakespeare. Three credit hours.

9. **The Drama.** Modern Drama, from Sheridan to the present time. One credit hour.

10. **Business English.** This course is designed to meet the needs of students following the program of Commerce. Accuracy and speed in the various business forms will be demanded for credit in this subject.

[Four hours a week for two terms.]

Graduate Work in English. Students wishing to do advanced work in English will be provided with library facilities and led through the usual work for the degree of Master of Arts, Doctor of Philosophy, or Doctor of Letters.

The major subject on approval of the Faculty of English may be any special aspect of a literary form or epoch, or a comparative study of related authors.

Seminar work, the study of texts, and special lectures by professors make up the course.

GEOLOGY

1. **Principles of Geology.** Lectures, recitations, demonstrations. The study of the general features of the earth; the material composing the accessible parts of the earth; the classification of rocks and rock forming minerals; the causes of geological changes; the history of the earth and the various forms of life that existed in the different periods of successive geological ages.

[Three hours a week for one term.]

2. **Mineralogy.** Lectures recitations, and laboratory work. A study of the principles of crystallography and the classification of minerals, accompanied by practice in the laboratory and museum in the determination of minerals, especially the ores. Blow-pipe analysis.

[Two hours a week for one term.]

3. **Mineralogy.** The object of this course is to train the students to identify minerals by their physical characteristics, such as crystal form, cleavage, color, hardness and specific gravity without having to resort to blowpipe or chemical tests except in the rare minerals. Recitations are made upon drawers of minerals in which the student points out the distinguishing features by which he recognizes the different minerals.

[Three hour a week for two terms.]

4. **Crystallography.** In this course there is made a complete study of the laws in the different systems of crystal formation, by means of laboratory work in models, natural crystals and cleverage specimens.

[Five hours a week fot one term.]

5. **Petrography.** This course is a study of rocks with regard to their classification, structure, mineralogical constituents, chemical composition and alterations; a study of the physical and optical characters of the minerals shown in thin transparent rock sections with aid of the microscope; a practical study of rocks in the hand specimens and also in summer field work.

[Two hours a week for two terms.]

6. **Geology, Physical and Chemical.** A course treating of the origin and alterations of rocks, of general eruptive and earthquake action, metamorphism, fault-

ing, jointing, and mountain building: the action of atmospheric agencies, surface and underground water. All of which subjects are especially considered in their application to mining pursuits.

[Three hours a week for one term.]

7. **Geology, Economic Mining.** A study of the genesis of the useful ore deposits, both metallic and non-metallic; an analysis of the relation existing between structural, dynamic and chemical geology, petrography and the ore deposits encountered in mining operations. Frequent reference is made to the bulletins, monographs and reports of the United States Geological Survey.

[Two hours a week for one term.]

GERMAN

1 (a). **Elementary German.** Grammar. Translation. Easy Readings. Conversation is introduced as soon as the student's progress warrants it.

[Four hour a week for one term.]

1 (b). **Elementary German.** This course is designed for students entering at the beginning of the second semester. It parallels 1a.

[Four hour a week for one term.]

2. **Narrative Prose.** Grammar. Readings. Conversation. Prerequisite: One year of high school German, or German 1a, or 1b.

[Four hour a week for one term.]

3. **Narrative Prose.** Readings from standard prose authors. Selected Lyrics. Conversation. Prerequisite: Two years of high school German, or German 2.

[Four hour a week for one term.]

4. **Prose.** Readings from Standard prose authors. One drama. Conversation. Prerequisite: Three years of high school German, or German 3.

[Four hour a week for one term.]

5. **Scientific Prose.** Readings selected. Prerequisite: Three years of high school German, or German 3.

[Two hours a week for two terms.]

6. **Elementary Composition.** Conversation. Simple themes. Prerequisite: Four years of high school German, or German 4.

[Two hours a week for two terms.]

7. **Intermediate Composition.** Prepared translations from the current magazines. Themes. Conversation based on current newspaper topics. Prerequisite: German 6.

[Two hours a week for one term.]

8. **Advanced Composition.** Sight translation of stories from the current magazines. Themes. Discussions in German. Prerequisite: German 7.

[Two hours a week for one term.]

GREEK

1. Homer. *Iliad:* Text Edition. Lysias: Select Orations. St. John Chrysostom: *Eutropius.* (Elective). Prose Composition.

[Four hours a week for two terms.]

2. Homer. *Odyssey,* Text Edition, (elective). Herodotus: Selections. St. Basil: *De Profanis Scriptoribus.* St. Gregory: *Machabees,* (elective). Advanced Prose Composition.

[Four hours a week for two terms.]

3. **Demosthenes:** The Speech on the Crown, or the Olynthiacs and the Philippics. Or,

Thucydides: one book. Aeschylus: one play, selected. Sophocles: *Oedipus Tyrannus.*

[Two hours a week for two terms.]

4. Euripides: one play, selected. Plato: The Apology and Crito. Thesis. About twenty-five hundred words in length.

[Two hours a week for two terms.]

Graduate Work in Greek. Advanced courses of instruction in the Greek language and literature will be provided for graduate students who look forward to the Master's or Doctor's degree. The center of work will be the Greek seminar, devoted to the interpretation of passages selected for that purpose by the director of the seminar, and to a critical study of one particular author or group of authors in the same department of Greek literature; as for instance, Homer, Plato, the orators, the historians, the dramatists, etc.

The work of the seminar will be supplemented by lectures on the history of comparative philology, on comparative grammar, and on the Greek dialects.

For those who desire a broader basis for their linguistic studies, an elementary course in Sanskrit will be offered.

HISTORY

ANCIENT HISTORY

1. **Ancient Greece** to the conquest by Rome of the Hellenic world. Readings and examinations on required texts. Special attention is given to the following topics: geographical features; the religion of

the people; the growth of the city-state; Sparta and the Peloponnesian League; Athens,—the forces that led from monarchy to Democracy; the time of Pericles; Macedon; the Empire of Alexander; literature and art; the Hellenistic Period. A study is made of the political and social forces that led to the supremacy. Roman ideas, thus making Course 1 a preparation for the history of Ancient Rome in Course 2.

[Four hours a week for one term.]

2. **Ancient Rome** to the Barbarian Invasions. Readings and examinations on required texts. The treatment of this course is similar to that followed in 1a. Particular emphasis is placed on the social and political life of the Roman people, though due attention is given to the various military activities. The course involves a careful study of the Roman kings, the early Republic, the spread of Roman power, the Punic Wars, the changes that led to monarchy, the decline of the empire, the barbarian invasions, the beginnings of Christianity.

Class discussions and weekly reports form an important part of the work in Courses 1 and 2.

[Four hours a week for one term.]

MEDIEVAL AND MODERN HISTORY

3. **The History of Western Europe from the Beginning of the Christian Era to 1648.** The conflict of Paganism and Christianity; the development of the Church's political power; the invasion of the Barbarians; Feudalism; the guild as a factor in town life; monasticism and the rise of the universities. A detailed study is made of the Renaissance, the Protestant Revolt, and the Catholic activities in the latter

half of the sixteenth century, especially the work of the Council of Trent.

[Four hours a week for one term.]

4. The General History of Europe from the Close of the Thirty Years' War to the Present Time. Attention is given to the rise and development of Modern European countries; the economic growth of Europe; the French Revolution and the Napoleonic Era; the Franco-Prussian war; causes and probable effects of the great European war; religious thought in present day Europe. The work closes with a comparative study of European governments.

[Four hours a week for one term.]

5. The History of the British Isles from the Roman Invasion to the Present Time. Britain before the introduction of Christianity; monastic life; England during the Crusades; the meaning of the Magna Charta; the jury system; the growth of parliament; commercial and military relations with the continent; town life; the Church of England; the Napoleonic wars; the industrial revolution; the growth of political parties. Regular reports by students on special topics are required.

[Three hours a week for two terms.]

6 (a). American History from its Beginning to the Present Time. A large part of the work in this course consists in the preparation of special topics by the students. No text book is used. An effort is made to train the student in the use of original sources, as well as in the discriminating use of secondary authorities. Weekly tests are given on the lectures and assigned readings. The following topics receive special attention: America before the time of Columbus; early discoveries and explorations; conflicting European claims; colonial institutions; the Church in the colonies; growth of industries; colonial wars; the revolutionary period; the conflict over slavery; reconstruction; rise of political parties; the place of America in world politics.

[Three hours a week for two terms.]

6 (b). American Church History from its Beginning to the Present Time. No text book is used. Weekly reports on assigned readings are required. Special attention is given to the work of the early missionaries; an examination of the various religious denominations in colonial times; religious tolerance before the Revolution; the colony of Maryland; Catholic leaders; the Know-Nothing Movement; Trusteeism; later anti-Catholic organizations; Catholic journalism; the Catholic educational system.

[One hour a week for two terms.]

GENERAL HISTORY

7. A General Course in Medieval and Modern History with special reference to the most important periods. This course is especially designed for students in the colleges of Law, Science, and Engineering.

[Four hours a week for one term.]

IRISH HISTORY

8. (a). Irish History from the Earliest Colonists to the Present Time. The purpose of the course is to acquaint the student with the true story of Ireland by presenting a statement of facts. Early Irish religious beliefs, customs, racial characteristics, systems of government are discussed, and specific topics are assigned for research.

8 (b). A course of lectures on the modern Celtic movement with a study of the modern Irish writers.

[Four hours a week for one term.]

POLISH HISTORY

9. History of the primitive Slavs. The rise of the Polish Nation. The Epoch of the Piast-Dynasty (962-1386).

The Jagiellonian Epoch (1386-1572).

Poland during the rule of the Elector Kings (1572-1795).

Poland in its Partitions. From 1795 to the present time. Polish Emigration.

No particular text-book is used in this course. It is a lecture-course; and the student is required to consult the principal authors to supplement the notes gathered from the lectures in class.

LATIN AMERICAN HISTORY

10. This course consists of lectures, readings, and the preparation of reports by the students. A two-year's course in Spanish is a prerequisite, since the student must be able to read sources in Spanish and Portuguese. The course considers the discovery and exploration of Latin America; the Spanish and Portuguese colonial policy with reference to religion, education and general culture, local government, industry and commerce; the influence of the French Revolution on the movement for independence; the rise of the independent states; the social and economic problems of the present republics. This course is required for students of Foreign Commerce.

[Four hours a week for two terms.]

JOURNALISM

FIRST YEAR

1 (a). History of Journalism.

[Three hours a week for one quarter.]

1 (b). Comparative Journalism. A study of existing types of publications,—metropolitan and small city dailies, country weeklies, class and trade papers, magazines.

[Three hours a week for one quarter.]

2 (a). The Country Weekly.

[Three hours a week for one quarter.]

2 (b). Newspaper Organization. Editorial, Business and Mechanical Departments; Proof-reading.

[Three hours a week for one quarter.]

During his freshman year, the student is expected to acquire satisfactory facility in the use of the typewriter.

SECOND YEAR

3 (a). News. Its nature, value and classifications; gathering news; structure and style of news stories.

[Three hours a week for one quarter.]

3 (b). Gathering News. News associations, special correspondence, reporting; covering various kinds of news, the expected and unexpected; speeches, interviews, trials; newspaper criticism,—art, music, dramatic, literary, with particular lectures from department heads, and assignments of plays for criticism, books for review, under direction of editors of *The Scholastic* and *The Ave Maria;* art galleries, operatic and other musical performances, under direction of the proper department heads; oral English,—dictating over and writing from telephone.

[Three hours a week for one quarter.]

4 (a). Follow-up and Re-write Stories; feature stories, editing copy.

[Three hours a week for one quarter.]

4 (b). Headline Writing; Make-up; assignments in University printing office.

[Three hours a week for one quarter.]

THIRD YEAR

5. Circulation. History of; basic principles; city, suburban and country problems; campaigns; reader-interest features; Sunday and special editions; supplements; postal regulations; modern circulation opportunity especially in country field.

[One hour a week for two terms.]

6. Advertising Place and importance in business; the advertiser, his article, the people; points of contact; psychology of advertising; mechanics of, language of, ethics of; advertising media; waste in advertising; undeveloped fields.

[Three hour s aweek for two terms.]

FOURTH YEAR

7 (a). The Editorial Page. Editorial writing; paragraphs, column writing, editorial features; illustrations and cartoons; editorial policy.

Special courses in cartooning and commercial drawing are given in the art department. They are elective.

[Four hours a week for one quarter.]

7 (b). Ethics of Journalism. Laws affecting publications; rapid writing drills.

[Four hours a week for one quarter.]

8 (a). A Six Week Test Period, on a prescribed paper; lectures by deans of particular schools on news and feature writing on special subjects, series of lectures by department heads from metropolitan newspapers. Review.

[Four hours a week for one quarter.]

8 (b). Magazine Writing.

[Four hours a week for one quarter.]

Reference work is assigned throughout the entire course in journalism. The student is encouraged to elect a particular field, and to write his graduation thesis upon a subject embraced within this field.

LATIN

1. Vergil: *Bucolics* and *Georgics*. Cicero: *De Senectute* and *De Amicitia*. Prose composition: Scheier.

[Four hours a week for two terms.]

2. Cicero: *De Oratore*. Horace: *Odes* and *Satires. Literary Epistles* and the *Ars Poetica*. Advanced prose composition: Scheier.

[Four hours a week for two term.]

3. Livy: Books 21 and 22. Tacitus: *Agricola; Germania*. Terence: one play, selected. Original themes, bi-monthly. Seminar: Monthly papers on the authors and their works.

[Three hours a week for two terms.]

4. Cicero: *De Officiis*. Quintilian. *De Institutione Oratoria,* Books 10 and 12. Plautus: *Captivi*.

[Three hours a week for two terms.]

LIBRARY SCIENCE

LIBRARY ECONOMY

1. Order Work. Lectures, class practice work and required readings. Some of the topics discussed are order routine, check lists, prices, discounts, book importations, auctions, second-hand buying.

[One hour a week for one quarter.]

2. Classification. Lectures, class practice work, and required readings. Dewey decimal system. Comparative studies are also made of other systems, especially the Cutter expansive system. The Cutter-Sanborn system of author tables is used in connection with the Dewey system. Adaptations of the Dewey System by the Institute Internationale de Bibliographie of Brussels. Brief history of classification.

[Two hours a week for two terms.]

3. Accession Work. Lectures, class practice work, and required readings, discussion of forms and rules governing accessioning, withdrawals, replacements, substitution. correction.

[One hour a week for one quarter.]

4. Cataloging. Lectures, class practice work, and required readings. Dictionary catalog based on A. L. A. rules. Comparative study of other catalog forms, especially classed and alphabetic classed. Use of Library of Congress printed cards and their adaptability to the Dewey System. Co-operative cataloging. Subject headings and lists of the Library of Congress and their adaptation to public libraries. Government documents. Special problems of university and large reference libraries. Full or short catalogs. Use of cataloguer's reference books.

[Three hours a week for two terms.]

5. Shelf-Listing. Lectures, discussions, and class practice work. Methods and arrangements for shelf-listing, inventory, preservation of pamphlet material.

6. Indexing. Lectures, class practice work, and readings. Rules for filing cards, arrangement of guide cards, use of cross reference, choice of headings, verification, temporary entries, marking matter for indexing and editing for print, correct citation.

7. Book-Binding. Lectures, class practice work, problems, and readings. This work is under the direction of a competent book-binder. Preparation and arrangement of books and periodicals, card records, binders specifications, terminology, binding materials, sewing, forwarding and finishing. Special attention is also given to book binding as an art. Library Economy 5, 6, 7, one hour a week for one term.

8. Loan Work. Lectures, practice work, and readings. The general principles governing loan systems. Browne, Newark, Columbia University and other systems are examined and the merits of each are carefully discussed. The experience of American libraries regarding registration, number of books allowed, fines, time limit, open access, traveling libraries, school collections, work with foreigners, library advertising.

[Two hours a week for two terms.]

9. History of Printing and Book Illustration. The invention of printing and its subsequent history, with special attention to the study of incunabula. The typography of William Caxton, Aldus Manutius, Elzevir and others. The history of book illustration, wood-cuts, etchings, engravings, aquatints, mezzotints, modern photo-mechanical processes.

[Two hours a week for two terms.]

BIBLIOGRAPHY

1. National and Subject Bibliography. Lectures, practice work, discussions, problems and readings dealing with scope and utility of bibliography with special attention given to descriptions and value of materials used. Brunet, Lowndes, Georgi, Peignot, Stein, Sabin, Valee, Horne, United States Catalog, British Museum Catalog and other national bibliographies are consulted. Bibliography of bibliographies and general bibliography. Subject bibliographies in the different branches of human knowledge are carefully studied and discussed. An original critical subject bibliography forms the thesis work necessary for graduation.

[Two hours a week for one term.]

2. Reference Work. Lectures, practice work, discussions, problems based on Kroeger's A. L. A. Guide to the Study of Reference Books. Special attention given to authority, arrangement, date, form and treatment. Character and scope of reference collections in public, college, university and institutional libraries. Preparation of materials for the use of literary, business, scientific and professional organizations. Principal features of legislative and municipal reference work. Periodical reference.

3. Selection of Books. Lectures, practice work, discussions and readings. This course is intended to train the librarian's power of judgment in the choice of books, to help him determine the special needs of a certain community, to familiarize him with principles governing selection in college, university and institutional libraries. American and foreign copyright. Attention is given to a systematic study of book reviews, editions, typography, paper.

4. Government Documents. Lectures, problems and discussions on the nature, arrangement, use and value of municipal, state, and national documents. Documents of the Federal Government at large, the legislative body, the executive body and the judiciary. Departmental publications and their purposes. Government serials. Examination and use of such guides as Poore's Descriptive Catalog of Publications of the United States Government, Ames' Comprehensive Index to the Publications of the United States Government. Document Index, Checklists of United States Documents, Materials in the Documents of the States of the United States prepared for the department of economics and sociology of the Carnegie Institution of Washington by Adelaide R. Hasse. Government Depositories. Public Affairs Information Service. [Bibliography 2, 3, 4, two hours a week for one term.]

5. History of Books and their Makers. Books in manuscript. Work and influence of the Scriptorium in the monastic institutions. Books in the early universities. Early publishers.

[Two hours a week for one term.]

ADMINISTRATION

1. Administration. Administration of small town and city libraries, large metropolitan libraries and their branches and stations, college, university and institutional libraries, regulation and control of departmental libraries and specialized collections; essence of librarianship; the library staff, its qualifications, and salaries; library organizations, business office of a library, library associations, state and national; library extension work.

2. Library Construction. Lectures, criticism of plans and discussions of modern types of library buildings; methods of library work as they effect construction, proper arrangements and correction of departments. General principles of library architecture; librarian and the architect; features in good library planning; book storage, determination of book space, library equipment.

[One hour a week for one quarter.]

3. Library Work With Children. Short study of the needs of children's departments, graduation of reading, organization, management and equipment of children's rooms.

[One hour a week for one quarter.]

4. History of the American Library System. Lectures, discussions and readings. Comparison with foreign systems; advantages of modern methods of work and administration.

[Two hours a week for one term.]

Notes and Samples. Every student taking a degree or certificate in Library Science must form a collection of materials used in illustration of library work and must also show by notes that he has grasped the underlying principles of the different courses in Administration, Bibliography and Library Economy.

Practice work means the mental and physical application of the principles taught in lectures, discussions and readings; in other words the application of laboratory method.

MATHEMATICS

There will be a course in Review Mathematics, two periods a week, for all freshmen that need or desire the work.

1. Trigonometry. This subject includes both plane and spherical trigonometry. The work is the equivalent of that in most of the elementary text-books, Special attention is given to goniometry on account of its application to calculus, and examples of a concrete nature are abundantly supplied.

[Four hours a week for one term.]

2. Algebra. This course includes a study of the binomial theorem, the theory of logarithms, choice, chance, variables and limits, series, determinants. Then follows a thorough study of the general properties and solution of equations, embracing the subjects of derivatives, transformation, detached coefficients, surd and imaginary roots, incommensurable roots, limits of roots, biquadratic equations, Descartes' and Cardan's rules; Sturm's theorem, Horner's method.

[Four hours a week for one term.]

3. Analytic Geometry. This course includes a study of the point and right line; conic sections; their equations and properties; discussion of the general equation of the second degree containing two variables; different systems of co-ordinates; transformation of co-ordinates; an elementary course of geometry of three dimensions, embracing the point, straight line, plane and surfaces of revolution; transformation of co-ordinates; quadric surfaces and supplementary propositions.

[Five hours a week for one term.]

4. Calculus, Differential. This course includes a study of the methods for the differentiation of algebraic, logarithmic and exponential, trigonometric, and inverse trigonometric functions, successive differentiation, and differential coefficients; treatment of implicit and compound functions; indeterminate forms; partial differential coefficients of the first order and of higher orders; direction of curvature; radius of curvature; envelopes; maxima and minima of functions of one independent variable, and of several independent variables; tracing curves; differentials of arcs, plane areas, surfaces and volumes of revolution.

C. E., M. E., E. E., I. E.
[Six hours a week for one term.]
E. M., B. S. in Chem., Ch. E.
[Three hours a week for one term.]

5. Calculus, Integral. Integration of elementary forms and of rational fractions; integration by rationalization and by parts; successive integration; multiple integrals; definite integrals, limits of integration; double integration applied to plane areas; rectification of plane curves; quadatures of plane areas and surfaces of revolution; surface and volume of any solid; intrinsic equation of curve. This course is supplemented by numerous exercises and examples.

C. E., M. E., E. E., I. E.,
[Six hours a week for one term.]
E. M., B. S. in Chem., Ch. E.
[Three hours a week for one term.]

6. Differential Equations. An elementary course for Engineering students, supplementary to the course of integral calculus. It embraces equations of the first order and degree; equations of the first order, but not of the first degree; singular solutions; linear equations with constant coefficients; special forms of equations with higher orders. Numerous applications to mechanics and physics are introduced during the course.

[One hour a week for one term.]

Graduate Work in Mathematics. Master's Degree. Any three of the following courses and thesis. Theory of Functions of a Complex Variable. Fourier's Series and Bessel's Functions. Theory of Functions of a Real Variable. Quarternions. Theory of Differential Equations. Elliptic Functions. Elliptic Integrals. Partial Differential Equations. Metric Differential Geometry. Vector Analysis Applied to Electromagnetic Theory. Projective Geometry. Algebraic Theory of Invariants.

MECHANICAL ENGINEERING

1. Thermodynamics. A comprehensive detailed study of the theory of the steam engine, steam turbine, gas engine and other heat motors involving the laws of thermodynamics of gases, saturated vapors and superheated steam. After the ideal standards are established their modifications in practice are dwelt upon in applying the principles to prime movers, the boiler, condenser, pumps and refrigerating machinery. The work includes a general study of the different types of internal combustion engines as well as an economic study of the operation of power plants. Frequent reference is made to trade catalogues on file in the department library. Must be preceded by Course 14.

[Four hours a week for two terms.]

2. Materials of Engineering. This course, supplemented by shop work and laboratory work in testing material of construction, is designed for the purpose of acquainting the student with the properties of the materials he will use in his profession. Tensile and shearing strength, elasticity and resistance are studied together with the effects of strain, intermittent loading and impact. The process of manufacture of the most important materials is taken up, and estimates of the cost of construction at market prices complete the work.

[Two hours a week for one term.]

3. Steam Power Plants. The preliminary work of this course comprehends a brief study of the history of the steam engine together with its development and differentiation into the standard types at present on the market. Subsequently, the elements controlling designs for specific purposes are considered. Finally the study of the Power Plant as a whole is taken up and the relations between engines, turbines, pumps, condenser, boilers, piping, fuel and auxiliaries are dwelt upon in detail. A completely worked out plan for a specific equipment is required of each student.

[Five hours a week for two terms.]

4. Steam Boilers. This subject is treated much as that of Course 3. The determination of sizes of parts from consideration of strains, thickness of shells, size of rivets, braces, furnaces and proper methods of connection of boilers, efficiency of furnaces and life of boiler are some of the subjects considered. The method of determining the efficiency of fuels, heating surfaces, heights of chimneys, boiler setting and materials used in construction are also discussed.

[Three hours a week for one term.]

5. Kinematics. This course treats of the geometry of machinery, the determination of the paths of the various parts of an elementary combination and the constraining of the parts to move in these paths. The general theory is then applied to cams and gear teeth, the relative motion of machine parts and the kinematic trains, belts, pulleys, speed cones, link work and other aggregate combinations.

[Two hours recitation and two hours drawing
a week for one term.]

6. **Machine Design.** This work involves a study of form and strength of machine parts as applied in designing, with computation of dimensions for fastenings, bearings, rotating pieces, belt and tooth gearing, etc. The derivation of rational formulae and the determination of empirical formula are included and applied in designing.

[Two hours a week for one term.]

7. **Gas Power Plants.** A study from text-book, reference works, current technical magazines and catalogues of manufacturers of the adaptation of the various types of prime movers available as power sources. From a set of specifications for a given power plant submitted to the student, a detailed plan is required, showing the selection and arrangement of the power units, method of piping, arrangement of fuel handling apparatus and other auxiliaries.

Must be preceded by Course 10 and taken in conjunction with Course 11.

[Three hours a week for one term.

8. **Mechanical Laboratory.** The work taken up includes a study of the methods of testing the steam engine under varying running conditions, valve setting, calibration of thermometers, gauges and indi-

cator springs, use of Pony brake, Weber and Emerson dynamometers, Pelton water wheel, Weir calibration, etc.

[Five consecutive hours a week for one term.]

9. Steam Boilers and Engines. A brief course in the study of boilers and steam engines designed to familiarize the student with the different types in use and their respective merits. Only that theory is taken up which is necessary to the working out of problems, the ultimate object of the course.

Students taking this course must provide themselves with an abundant supply of trade catalogues.

[Three hours a week for one term.]

10. Gas and Vapor Engines. This course, extending over two terms, is given to a general descriptive study of all the types of gas engines and explosive motors. The general construction of gas, oil, vapor engines is studied together with their adaptations to various uses.

Results due to change in ignition, compression and variation of working fluid; methods of speed regulation and governing and the details of auxiliaries as pumps, carburetors, hot tubes, batteries, spark coils and dynamos are dwelt upon.

[Five hours a week for two terms.]

11. Gas Engine Design. A complete study of the thermodynamics and design of the gas engine, by textbook, lectures and drawing board. The major subjects taken up are power, efficiency, economy, forces due to gas pressure and inertia and dimensions of engine parts.

[Five hours of recitation and seven hours of drawing a week for two terms.]

12. Gas Engine Construction. The complete working up from rough castings and forgings of a small type of gas engine. This is part of the thesis work for students in the Short Program and requires the complete machining and assembling of the engine and must be preceded by Courses 10 and 11.

[Three hours a week for two terms.]

13. Gas Engine Laboratory. Indicator practice, commercial efficiency, governing, economy, speed regulation. Experiments in ignition, spark coil construction, carburetors and vaporizers. Test of engine constructed by the student.

[Two afternoons each week for two terms.]

14. Elements of Steam Engineering. A general survey of the application of heat to the development of power in prime movers, including sources of heat, methods of rendering it available and its utilization in boilers, pumps, engines, turbins, condensers and heatings systems. Drawing board work on valve gears, tangential force diagrams, governors, flywheels and general mechanics of the steam engine is included.

[Five hours a week for one term.]

Thesis. Each candidate for a degree in Mechanical Engineering must present for graduation a thesis of considerable magnitude which will exhibit his knowledge of the courses he has followed. It may embrace designing, experimental investigation or original research, in a subject selected by the student and approved by the professor. The major part of the second term, senior year, is devoted to this work, and graduation is conditional upon the knowledge of mechanical engineering displayed in its preparation.

METALLURGY

1. **Metallurgy.** Among the subjects studied in this course are the following—classification of ores, sampling, crushing, milling practice, roasting, smelting and cyanidation, the various extraction processes of the following metals—gold, silver, copper, lead and zinc, are given special attention; the production of pig iron in blast furnaces.

A trip of inspection is made to smelting plants, blast furnaces and mills in order to familiarize the student with metallurgical plants in operation.

[Three hours a week for one term.]

2. **Assaying.** Chiefly laboratory work. Furnace assaying of the ores of gold, silver and lead.

[Two laboratory hours a week for one term.]

3. **Assaying.** This course consists chiefly of laboratory work accompanied with lectures on the determination of the quantities and values of the metals, gold, silver, lead, zinc, copper, and iron as found in the various ores, minerals, smelter and mill products. The fire assay or fusion method with crucible is used when assaying for gold, silver and lead, while scorification is used with certain silver ores. Volumetric assaying is used for copper, zinc and iron. Cyanide solutions in the extraction of gold and silver by the cyanide process, are made up and tested volumetrically for strength; pregnant solutions being assayed for gold and silver. The methods of sampling and assaying mill products such as concentrates, middlings and tailings, also the methods applied in smelter are studied. General smelter practice in the buying and classification of ores and the method of settlement with the shipper

by umpire assay are subjects treated. Special attention is given in the course to familiarizing the student with the minerals constituting the various ores studied and assayed, which knowledge is essential to the selection of the proper method to use in each assay.

4. Ore Dressing. A course in which a detailed study is pursued of the various processes of mechanically separating and saving valuable minerals from the valueless gangue of ores, whereby the valuable minerals are concentrated into smaller bulk and weight by discarding a large portion of the waste.

The principal subjects treated are: Preliminary and final crushing by means of rock-breakers, steam and gravity stamps with amalgamation; rolls, Chilian, Huntington, tube and ball mills; screen sizing and classifying; sand and slime concentrating on jigs, tables and vanners; magnetic separation, pneumatic concentration, oil flotation process; locating and constructing the mill. The course includes a trip of inspection to a number of the most modern concentrating mills in the Ontario district where the student engages in practical work in the study of mill construction, operation and efficiency.

[Three hours a week for one term.]

MINING ENGINEERING

1. Principles of Mining Engineering. This course includes a general study of Mining operations divided into the following subjects: Occurrence of minerals in the earth's crust, discovery, boring, excavation, supporting excavations, exploitation, haulage, hoisting, drainage, ventilation, lighting, access, ore dressing and treatment.

[Three hours a week for two terms.]

2. Mine Surveying. A study of the subject of surveying in its special application to mines, through lectures, plotting of problems and recitations; for students who take the summer course in the mines. The following subjects receive particular attention—recording of notes in underground traverses and their subsequent plotting, a comparison of metal mine, and coal mine surveys, the methods of connecting surface with underground surveys by means of both the auxiliary telescope and plumb lines and the deputy mineral surveyor's methods of surveying mining claims for patent. Each student is required to make a complete mine map from notes of actual mine surveys.

[Two hours a week for one term.]

MICROSCOPY

1. Microscopy. Lectures and laboratory work. Refraction and dispersion of light and illumination. The index of refraction in different media. Different shapes of lenses. Spherical and chromatic aberration. The selection and care of a good microscope. The use of accessories for advanced work; immersion and adjustable objectives, camera lucida, sub-stage condenser, polarizer, micrometers, etc. Special work in photomicrography. This course is given in connection with Bacteriology.

2. Micro-Chemistry. Laboratory work. The preparation of micro-chemical reagents and their application in testing, fixing, hardening, staining, cleaning and mounting tissues and organs.

[One laboratory hour a week for one term.]

MUSIC

PIANO

1. **Elementary Classes.** The following is a list of some of the studies used in the elementary work, chosen according to the needs of the individual pupil. Simple five finger exercises for hand position. Simple arm and wrist exercises. Loeschorn Studies Op. 65 Book I. Lemoine Etudes. Clementi Sonatinas. Kuhlau Sonatinas. Heller Op. 47. Behrens Op. 61. Book I. Solos selected from various composers according to the need of the pupil.

2. **Advanced Classes.** This class is preparatory to the Artist Class. There can be no time limit set in these classes as it depends entirely on the talent and application of the pupil. The following are some of the teaching materials used: Studies: Czerny, Opus 299 and 740, Clementi Gradus, Cramer Etudes, Bach, two and three part inventions. Studies and pieces for more advanced pupils:—Bach's Preludes and Fugues, Sonatas, Mozart and Haydn, and easier sonatas by Beethoven, also pieces by Handel, Rameau, Scarletti, Mendelssohn, Weber, easier pieces by Schuman and Chopin, Modern compositions by Grieg, Rubenstein and all the other composers of importance—Concertos by Mozart, Beethoven (Op. 15-19), Mendelssohn (Op. 22), Hiller (Op. 54), Moscheles (Pp. 58), and Hummel (Op. 85-89).

3. **Artist Class.** Only pupils with talent and a certain musical maturity and technical proficiency can be admitted to this class. All piano literature of value is taught.

VIOLIN

1. Studies by Wichtl, Ries, Mazas, Kreutzer, Fiorillo. Compositions by Dancla, DeBeriot, Sitt.

2. Studies by Rode, Schradieck, Dont. Sonatas and pieces by Tartini, Bach, Beethoven, Mozart.

3. Sonatas by Bach. Studies by Schradieck-Alward, Wieniawski. Concertos and pieces by Sphor, Vieuxtemps, Mendelssohn, Dvorak.

4. Studies by Paganini. Concertos and pieces by Beethoven, Brahms, Burch, Joachim and others.

ORGAN

1. Rink Organ School. Eugene Thayer Studies. Light Preludes and Fugues by Bach.

2. Schneider-Warren Pedal Studies. Easy sonatas by Mendelssohn, Merkel, Rheinberger. Preludes, fugues by Bach. Twenty Studies by Whiting. Canonic Studies by Chadwick.

3. Sonatas, preludes and Chorale Vorspiele by Bach. Concert pieces by Handel, Merkel, Salome, Whistling, Best, Rheinberger.

4. The greater preludes, fantasies and fugues of Bach. Sonatas and concert pieces by Thiele, Widor, Dubois, Builment and Saint-Saens.

VOICE PRODUCTION

1. Tone-Placing. Diaphragmatic breathing-control. Articulation. Text-book, Shakespeare's Art of Singing, Part I; Kofler's Art of Breathing; Studies by Bassini, English songs.

1 (a). Vocal Sight Reading. Elementary theory of Music. Intervals and ear-training. Choir practice.

2. Advanced Breathing Exercises. Study of the chest and falsetto registers. Stroke of the glottis. Textbooks, Shakespeare's Art of Singing, Parts II and III. Studies from Italian operas; French and English songs.

2 (b). Vocal Sight Reading. Phrasing, punctuation and advanced study. Practice in operatic chorus-work.

3. Study of trill, mordent, gruppetto, etc. Messa de Voce.

THEORY

1. Harmony. Construction of intervals, scales and chords; harmonizing from figured bass and harmonization of simple melodies. Text-books: Elements of Harmony, Emery. Harmony, Richter, Jadassohn, Prout.

[One hour a week for two terms.]

2. Harmony. Continuation of Course 1.

[Two hours a week for two terms.]

3. Counterpoint, simple two or four part harmony, double and florid counterpoint, canon and fugue, Text-books Richter, Jadassohn, Prout.

[One hour a week for two terms.]

4. Form and Composition. A study of the principles of the simple musical forms. Analytical, both harmonic and thematic, of the works of the masters. Text-books: Form, Conrell; Form and Applied Form, Prout.

[One hour a week for four terms.]

5. Instrumentation. A study of the technic of the different instruments and their combination. Text-book: Instrumentation, Prout, Berlioz, Hoffman, and Kling.

[One hour a week for two terms.]

6. History of Music. Elementary course.
[Two hours a week for two terms.]

7. History of Music. Appreciation and criticism. This course consists of lectures on various musical subjects and individual study of the different branches of musical history. Text-books: Musical Appreciation and Music and Life by Surette; History of Music, Dickenson. Also various musical scores.
[Two hours a week for two terms.]

8. Aesthetics. This course will consist in a general discussion of aesthetic theories and musical aesthetics especially. Text-books: Essentials of Aesthetics, Raymond; Musical Aesthetics, Hanslick and Riem. Catechism of Musical Aesthetics, Rieman. The Beautiful in Music by Hanslick .
[One hour a week for two terms.]

9. Aesthetics. Continuation of Course 8.
[One hour a week for two terms.]

CATHOLIC CHURCH MUSIC

10 (a). Gregorian Music. Subjects to be treated are: Gregorian Notation, Church Modes, Neums, Gregorian Rhythm, Psalmody, Antiphons, Hymns, Ordinary Mass Chants, and Variable Mass Chants. A portion of the time will be devoted to practical work. Text: "A New School of Gregorian Chant," Rev. Dom Johner, O. S. B.

10 (b). Part Music. A brief exposition of the various styles and schools. Representative selections from both the older and the modern composers will be studied. The nature, rhythm, and execution of the different styles of part music will be dealt with. (a) Polyphonic Music. Among the authors whose works will be studied are Palestrina, Victoria, Lassus, Kerle, Asola, and Tallis. (b) Monodic Music.

10 (c). Solfeggi. This period will be devoted to sight reading, ear training, voice production, and Latin pronunciation. Text: "Resonance in Singing and Speaking," Thomas Fillebrown.

[Three hours a week for two terms.]

11 (a). Gregorian Music. The work done will be a continuation of the work begun in the previous year. The "Motu Proprio" of Pius X will be explained and discussed; special attention will be given to Rhythm Psalmody, and the more florid Gregorian music such as the Responses, Graduals and Tracts.

11 (b). Part Music. The practical work will be a continuation of the work begun in the previous year.

11 (c). History of Church Music. Text: "Music in the History of the Western Church," E. Dickenson, the first 222 pages.

[Two hours a week for two terms.]

CHORAL CONDUCTING

12. This course is outlined with the view of giving the student the training necessary to enable him to conduct choral societies.

The simple but important subject of beating time is studied. Lectures on choral technic and interpretation are given. Various part songs, masses, oratorios, and operas are studied. Text-books: Choral Technic and Interpretation, Coward. Resonance in Singing and Speaking, Fillebrown. The Training of Boys' Voices, Johnson. Handbook of Conducting, Schroeder.

Students will have the opportunity of gaining practical experience in conducting the various choral organizations under the direction of the director.

[One hour a week for two terms.]

PHARMACY

1. **Elements of Pharmacy.** Lectures and recitations on the art and science of pharmacy, and demonstrations of the various pharmaceutical processes.

[Three hours a week for two terms.]

2. **Galenical Pharmacy.** A laboratory course to accompany Course 1. This course consists of the practical application of the pharmaceutical processes to the manufacture of official preparations of the United States Pharmacopoeia of unofficial and N. F. preparations.

[Five hours a week for one term.]

3. **Inorganic Pharmacy.** Laboratory, demonstrations and recitations. A thorough course in the preparation and testing of pharmaceutical and technical chemicals.

[Five hour a week for one term.]

4. **General Pharmacy.** A systematic classification of organic and inorganic drugs and preparations from a pharmaceutical standpoint followed by a close study of each of the classes.

[Two hours a week for two terms.]

5. **Magistral Pharmacy.** Includes the manifold methods of extemporaneous pharmacy with consideration of incompatibility, posology, and the principles of elegant pharmacy. Dispensing and prescription practice.

[Three hours a week for one term.]

6 (a). Pharmaceutical Chemistry. Chiefly assaying, testing and manufacturing. Determination of melting and boiling points, and solubilities. Some attention is given also to toilet and commercial preparations with a view to the invention and development of original formulas.

[Five hours a week for one term.]

6 (b). Pharmaceutical Chemistry. Assaying and manufacturing.

[Six hours a week for one term.]

7. General Pharmacy. Pharmaceutical analysis and assaying, micro-chemical, polariscopic and spectroscopic estimations, food analysis. Incompatibili ties and methods of manufacture. Alkaloids and other active principles.

[Five hours a week for one term.]

8 (a). Materia Medica. An elementary course in the general principles of the subject, covering the work outlined in the Syllabus.

[One hour a week for one term.]

8 (b). Materia Medica. This work embraces a detailed consideration of botanical drugs, their pharmaceutical definition and description, constituents, habitat, therapeutic action, use, dose and antidote. Attention is also given to mineral drugs and those of animal origin. They are studied individually at first, then in classes or groups. The grouping is so arranged as to make the subject comparatively easy for the student.

[Two hours a week for two terms.]

9. Pharmaceutical Arithmetic. This work includes a study of weights and measures, percentage, relationship of systems, reducing and enlarging formulas, alligation and chemical problems. The training prepares the student to master quickly and accurately the practical problems that continually confront the pharmacist.

[Three hours a week for one term.]

10. Pharmacognosy. The indentification of preparations and crude drugs by their physical properties with special reference to qualify and detection of adulteration. Attention is also given to the methods of preventing loss by improper storage or by the ravages of insects. Important drugs are studied under the microscope in cross section and in powder form.

[One hour a week for two terms.]

11. Commercial Pharmacy. A brief course in business methods, store-management, banking, accounting, and pharmacy.

[One hour a week for one term.]

12. Pharmaceutical Jurisprudence. A series of about ten lectures on Pharmaceutical Jurisprudence and Commercial Law.

13. Pharmaceutical Latin. A brief course in the essentials of Latin with special reference to prescription reading and pharmaceutical nomenclature.

[Two hours a week for one term.]

Thesis. During the third year the student is required to spend at least two hours a week in original research on a subject within the domain of Pharmacy. The results of this work are carefully recorded and must be typewritten and presented to the Faculty as a requirement for graduation.

PHILOSOPHY

1 (a). General Psychology. Consciousness, its modes and primary laws. The brain as the center of mental activity. Sensations and the psychological theories offered to supplement the physiology of the special senses. Perception and apperception, memory and imagination, attention and association. Lectures and text-book.

[Four hour a week for one quarter.]

1. (b). General Psychology. Feelings and emotions. The nature of voluntary, automatic and reflex movements; instincts and habits. The development of ideas, judgment and reasoning. Lectures and text-book.

[Four hour a week for one quarter.]

2. General Logic. Text-book, lectures, exercises. The elements of deduction. Induction and the methods of science. Material Logic.

[Four hours a week for one term.]

3. General Metaphysics. Transcendental concepts: their value in different systems of philosophy. Preceded by a brief course in Epistemology.

(Five hours a week for one term.)

4. Cosmology. The fundamental concepts of natural science in relation to Thomistic philosophy.

[Five hours a week for one quarter.]

5. Theodicy. The existence of God; His attributes. His presence in the universe.

[Four hours a week for one quarter.]

6. Philosophy of Mind. Nature, origin and destinv of the soul. The nature and freedom of the will.

[Four hours a week for one quarter.]

7. Ethics. A thorough study of the general principles underlying Ethics. Present day problems will be discussed in the light of these principles. A brief presentation of Sociology and Socialism will be given. The instruction will be by text-book, lectures and considerable collateral reading.

[Four hours a week for three quarters.]

8. The History of Philosophy. This course is intended to give the student in consecutive form the principal systems and philosophers in the Ancient, Mediæval and Modern periods. It will likewise serve as a review of the subjects treated in the general course of Philosophy. Philosophic Movements of the present day and writers of note in present philosophic thought will be discussed.

[Two hours a week for two terms.]

9. This course is for students following the Law. Its purpose is to give them a thorough training in correct thinking and to acquaint them with the problems of ethics in general, and, in particular, to note the bearings of ethical principles in the Law. Sociology and Socialism are briefly presented.

(a) **Logic.** Text-book, lectures and readings.
[Four hours a week for one term.]

(b) **Ethics.** Text-book, lectures and readings.
[Four hours a week for one term.]

10. Philosophy, Brief Course. A general course designed to acquaint the student with the important problems of philosophy. The second term is taken up with Ethics. It is hoped sufficient interest will be aroused in the student in this abridged presentation to enable him to continue, of his own accord, an intelligent study of this important subject. For Engineering and Science students.

[Four hours a week for two terms.]

11. Scholastic Philosophy. This is a two-year course in Scholastic Philosophy based on accepted Scholastic manuals—*Reinstadler's Elementa Philosophiae Scholasticae* is used at the present time. This course is given primarily for students who intend to enter the priesthood.

The following studies are given in one year: *Logica, Criteriologia, Ontologia, Cosmologia.* The studies of the other year: *Anthropologia, Theodicea,* and *Ethica.*

This course is preceded by Philosophy 1 and 2, thus *Logica* and the first part of *Anthropologia* are gone over rapidly. The subjects are taught five periods a week. *Ontologia* and *Ethica* are each given one term; *Logica* and *Criteriologia, Cosmologia* and *Theodicea,* each one quarter. The History of Philosophy runs parallel with the subjects treated. There is considerable collateral reading demanded.

Student Discussions. From time to time throughout the year students will be required to read and discuss papers on various subjects in the field of philosophic inquiry.

Electives: Laboratory exercises in Experimental Psychology. Abnormal Psychology. Comparative Psychology.

Graduate Work in Philosophy. Graduate work in the department of philosophy, leading to the degree of Master or Doctor, may be undertaken by students who have pursued the course described above. Candidates who have made undergraduate studies elsewhere must give evidence of ability to begin specializing at once. In the first and second years, research work will be conducted in the seminar and the psychological laboratory. Students will have the benefit of frequent consultation with the professors.

PHYSICS

1 (a). Elementary Physics. Recitations, experimental demonstrations and lectures. A general course, covering the mechanics of solids, liquids and gases; heat; magnetism and electricity; sound and light. The aim is to emphasize the idea of cause and effect, the importance of common things, the method of scientific attack, and the interpretations of facts, to arouse interest in science and stimulate thought. Particular attention is paid to the correct statement of principles. Supplemented with special notes and the solution of numerial examples.

[Three hours a week for two terms.]

1 (b). Experimental Physics. Individual laboratory work. The aim is to complete the student's fund of concrete knowledge and to cultivate his power of accurate observation and clearness of thought and expression. The exercises are chosen with a view to furnishing forceful illustrations of the fundamental principles and their practical applications.

[Two hours a week for two terms.]

2. General Physics. Recitations, experimental demonstrations and lectures. A thorough college course supplemented with special notes and including the solution of numerous problems. It consists of:

2 (a). Mechanics and properties of matter, physical quantities and their measurement, absolute systems of units, dimensional equations, kinematics, types of motion work and energy, machines, friction, gravitation, mechanics of fluids, surface tension, capillarity, viscosity, solution, diffusion, osmosis.

2 (b). Heat, thermometry, expansion, calorimetry, change of state, hygrometry, liquefaction of gases, distribution of heat, thermodynamics, kinetic theory of gases.

2 (c). Electricity, electrification, electrostatic instruments, magnetism, galvanometry, relations between heat and electricity, dimensions and units of electrical quantities, induction of currents, telegraph and telephone, passage of electricity through gases, radioactivity, electrical oscillations.

2 (d). Sound, wave-motion, water waves, capillary waves, production and propagation of sound, reflection, refraction, interference, resonance, vibrations of strings, rods and plates, compound tones, musical instruments, physical theory of music, audition.

2 (e). Light, nature and propagation of light, reflection, refraction, interference, dispersion, theory of optical instruments, maximum efficiency of optical instruments, optical phenomena of the atmosphere, radiation and absorption of light waves, sensations of color, polarization, Maxwell's electro magnetic theory of light.

[Four hours a week for two terms.]

3. Theoretical Physics. The subjects of mechanics, thermodynamics, the kinetic theory of gases, the wave theory of light, are developed by the use of elementary calculus. This course must be preceded or accompanied by a course in calculus. It is designed as a supplement to Physics 2 for sophomores in the engineering courses.

[One recitation hour a week for two terms.]

4 (a). Laboratory Physics. This course consists of an introduction to methods and instruments used in the physical laboratory. Study of precision and accuracy in measurements. The application of mathematics in physical work.

4 (b). Experiments in mechanics, sound and light. The exercises are all quantitative in character and are selected with a view to impress some important principle, to acquaint the student with instruments of precision, and to teach him to record and interpret experimental work. To guard against the perfunctory performance of the experiments, recitations are held in which the students are tested as to their knowledge of the physical principles involved in the experiments already performed, the precision of the methods used, and the correctness of formulas. At the end of each term a written examination is given on the theory and manipulation of the instruments and on precision of measurements. Students in Industrial Engineering do not take experiments in sound and light. They must give more time to mechanical measurements.

[Two laboratory hours a week for two terms.]

4 (c). Laboratory Physics. This course is the same as Physics 4 (a), (b), but is designed to meet the special needs of students in the Science courses. Experiments in mechanics, heat, electricity, sound, and light.

[Two laboratory hours a week for two terms.]

5. Advanced Electricity. Magnetism and Heat. Students in Electrical and Mechanical Engineering will have a special set of experiments, comprising:

5 (a). Electrical Measurements. Precision methods for measuring current, electromotive force, and resistance, and alternating current measurements, etc.

5 (b). Calorimetry. Methods of mixtures, specific heats, calorific values of gaseous and solid fuels, quantitative measurements of radiation and conduction of heat, etc.

5 (c). Magnetic Measurements. Determination of H, commutation curve for iron and steel, hyteresis curve for iron and steel. Accuracy in observation and in the calculation and recording of the results is required. This course must be preceded by Courses 2, 3, and 4.

[Two laboratory hours a week for two terms.]

6. Meteorology. A government station was installed at the University by the United States Weather Bureau in March, 1912. An elementary course in meteorology is offered to students.

[One hour a week for one term.]

7. Graduate Work in Physics. Courses in the Theory of Heat, Theory of Electricity and Magnetism, Optics, the constitution of Matter, Conduction of Electricity by Gases, Theory of Sound, and Hertzian Waves, are offered to graduate students qualified to enroll for a higher degree, and to undergraduates who are adequately prepared to do advanced work in Physics. Calculus is required to take up any of these subjects.

PHYSIOLOGY

1 (a). This course comprises lectures, recitations and demonstrations based upon some standard textbook of Human Physiology. A liberal supply of models, charts and manikins are at hand to facilitate all demonstrations required.

[Four hours a week for one term.]

1 (b). Laboratory work consisting of a selected number of experiments so arranged as to give the student a fair insight into modern experimental physiology. A limited number of microscopic preparations are required to be made by each student, and he must examine a set of typical preparations in order to acquire a fair knowledge of the microscopic structure of the tissues and organs of the human body. During the course special lectures will be given upon personal, domestic ,and municipal hygiene.

[One hour a week for one term.]

POLISH

1. Polish Language and Literature. Grammar (*Matecki's, Part I.*) Etymology. Exercises in spelling and reading. Grammar, *Part II.*· Syntax. Exercises in Composition. Short essays.

2. Rhetoric. (*Galle's Textbook*). Study of Essays in Models. (*Krasnowilski's Handbook.*)

3. Literature. *The History of Polish Literature. Part I.* From the beginning to the era of Adam Mickiewicz. (*Handbook: Tarnowski-Prochnicki.*)

4. Literature. *The History of Polish Literature. Part II.* From Adam Mickiewicz to the present time. (*Handbook: Tarnowski-Prochnicki.*) Essays.

SHOPWORK

Courses 1 to 5 inclusive are for students who wish to become specially proficient in various kinds of woodwork.

1. Elementary Woodwork. This course takes up the study of the common bench tools. It describes their action, explains their adjustment, shows how they may be kept in order. It contains a course of practice by which ability to use tools may be acquired. Grinding and sharpening edge tools. Lumbering and milling and the study of the various kinds of wood and wood finishing.

[Three hours a week for one term.]

2. Normal Wood-Working and Wood Turning. This course takes up the study of all the common wood working tools and tool processes. The simple forms of constructing used in fastening wood together and the reading and understanding of simple working drawings. All of which will be found of indispensable value, not only to students of manual training but also to those, who, either as amateurs or professionals have anything to do with work of a mechanical nature. This course embraces the laying out of duplicate parts, scraping and sandpapering, fastening parts, and simple joinery. The making of small pieces of furniture such as: taborets, magazine racks, foot-stools, hall racks, pedestals, book stands, benches and small tables. The exercises in wood turning takes up spindle turning, faceplate and chuck work. Wood finishing with the practicable use of stains, fillers, varnishes and paints, and the mixing of the same.

[Three hours a week for two terms.]

3. Farm Shop Work and Farm Structures. This course embraces the study and practice of farm structures such as: horse and dairy barns, sheep barns and sheds, poultry houses, corn houses and cribs, dairy houses and creameries, spring houses, root cellars and buildings of various kinds. The construction of feed racks for cattle and sheep, brooders, butter workers, hay racks, fences, plank drags, etc. Prerequisite: Course 1.

[Three hours a week for one term.]

4. Pattern Making. This course embraces the fundamental principles and elementary practice of the art of pattern-making. Shrinkage, draft, shake, warpage and finish. Cores and core boxes, horizontal, vertical, and irregular cores. Built up patterns, solid patterns and split patterns. Shelacing and varnishing patterns. Sufficient molding will be done to illustrate the use of patterns. Prerequisite: Course 1.

[Three hours a week for one term.]

5. Advanced Woodwork in Cabinet Making. An advanced course in woodwork dealing with cabinet making and furniture construction such as: bookcases, music cabinets, wardrobes, chairs and tables. Curved work, veneering, clamping table tops and surfacing. Paneling, molding and fitting doors. Simple upholstering and cane seating and wood finishing. Prerequisite: Course 2.

[Three hours a week for two terms.]

6. Engineering. An elementary course in woodwork and pattern making, prescribed for all engineering courses.

[Three hours a week for one term.]

7. Foundry Practice. Preparing moulds and core sand. Preparing cupola, fires and ladles. Making moulds and pouring metal for castings used in shop. A short instruction precedes each operation.

[One hour a week for one term.]

8. Machineshop. First Year. Lectures with illustrations on the screen precede each subject. Experimental exercises on drilling, planer, shaper, lathe, and milling machine. Building and machining small lathe which includes three methods of drilling, surfacing, turning, threading and grinding. The completion of this course will require two hundred actual hours.

[Two hours a week for two terms.]

9. Advanced Machineshop. Accurate work on all machines in constructing a 3½ h. p., two-cycle gas engine for mechanical engineers or one of each 3 h. p. direct current and alternating convertible motor and dynamo. Each operation completed from rough castings in brass, iron and steel including the spur and miter gears. The completion of this course will require two hundred hours.

[Two hours a week for two terms.]

ROMANCE LANGUAGES

These courses include the study of French, Spanish, Italian, Portuguese, Old French, Provencal.

The principal aim is to impart an accurate reading knowledge of literary works written in these languages. In the study, however, of Old French and Provencal, special attention will be paid to philology.

FRENCH

FIRST YEAR

1. Drill in French pronunciation; grammar, comprising the different parts of speech, their regular and irregular forms and the proper use of them; the forms of the regular verbs; easy written and oral exercises on the grammar.

[Four hours a week for one term.]

2. Study of the irregular forms of the verbs; the most common irregular verbs; the proper use of tenses in different classes; the essentials of syntax; dictation; oral and written exercises; reading of from 250 to 300 pages of French. Suitable texts: De Maistre's "La Jeune Siberienne," "Le Lepreux de la Cite d'Aoste," "Les Prisoniers du Caucase"; Daudet's "Neuf Contes, Choisis," "La Belle Nivernaise," Bazin's "Contes Choises."

[Four hours a week for one term.]

SECOND YEAR

3. Review of the grammar; dictation; conversation; oral and written exercises; reading of French prose from 300 to 350 pages. Suitable texts: Merimee's "Columba;" Chateaubriand's "Atala," "Rene;" Moliere's "L'Avare."

[Four hours a week for one term.]

4. Complete grammar; irregular verbs; syntax; French composition; conversation; reading of French poetry from 300 to 350 pages. Suitable texts: Chenier's "Poesies choisies;" Coppee's "Poesies Choisies;" Corneille's "Le Cid;" Racine's "Andromaque."

[Four hours a week for one term.]

THIRD YEAR

5. History of the French language; general view of the literature with a special study of the Renaissance period.

[Four hours a week for one term.]

6. Special study of the Drama. Reading of a play of each period.

[Two hours a week for one term.]

FOURTH YEAR

7. Conversation. Special works in prose and poetry.

[Two hours a week for one term.]

8. French composition. Special readings.

[Two hours a week for one term.]

SPANISH

1. Grammar with written and oral exercises from English into Spanish and from Spanish into English; essential of Spanish syntax and common idiomatic phrases. Readings and translations of Truba, Ferman Caballero, Samaniego and Iriarte.

[Four hours a week for one term.]

2. Grammar with written and oral exercises. Phonetic system. Dictations in Spanish. Simple conversation from popular books of the Spanish classics.

[Four hours a week for one term.]

3. Grammar with written and oral exercises. Composition. Dictation and conversation on practical topics. Reading and sight translation of popular Spanish classics.

[Four hours a week for one term.)

4. Grammar; Spanish Orthography. Commercial

Style. Compositions on commercial subjects and conversations. Reading, translating and papers on various topics.

[Four hours a week for one term.]

5. Literature of the Sixteenth and Seventeenth Centuries with composition and the history of the literature of the period. Reading of the classics. Assigned papers.

[Two hours a week for one term.]

6. Literature and composition. Reading of the classics with essays on various topics of the History of Spain and Spanish-American countries.

[Two hours a week for one term.]

7. Literature, Spanish Poetry; academic and diplomatic style. Readers: Ricardo Leon, Donoso Cortez and Emilio Castelar. Essays in Spanish.

[Two hours a week for one term.]

8. Early Spanish. El Poema del Cid. "History of the Literature of the Fifteenth Century," Reading commentary and essays.

[Two hours a week for one term.]

ITALIAN

1. A study of the grammar. Simple readings.

[Four hours a week for two terms.)

2. Grammar reviewed; readings; special attention to Dante's "Divina Comedia." Conversation in Italian.

PORTUGUESE

1. General outlines of grammar with compositions. Readings: *Perfil do marquez de Pombal, Camillo Cas-*

tello Branco; Novelhas Historicas, Pinheiro Chagas; Lendas e Narrativas, Herculano; Campo de flores, Joao de Deus.

[Four hours a week for two terms.]

2. *Sermoes, Padre Antonio Vieira. Os Lusiadas, Camoens.* History of Portuguese literature.

OLD FRENCH

Special attention will be paid to the laws underlying the formation of the French language from the popular Latin. It is from this point of view that the old French authors will be read, especially *La Chanson de Roland.*

PROVENCAL

Language and literature, with readings from the works of the Troubadours.

[Four hours a week for two terms.]

SOCIAL SCIENCE

ECONOMICS

1. **The Principles of Economics.** A general survey of the whole field of Economics.

[Four hours a week for two terms.]

2. **The History of Economic Thought.** A brief resume of the economic ideas of the Greeks and Romans; the influence of Christianity on economic doctrines; a brief treatment of the economists immediately preceding Adam Smith; schools of economic thought in the nineteeth century; the Classical, the Historical, the Austrians, the Socialists, contemporary economic thought in the United States.

[Three hours a week for one term.]

3. **Money, Credit and Banking.** This course considers the principles of money, the development of the currency and banking system of the United States giving special attention to the principles and the operation of the Federal Reserve Act.

[Four hours a week for one term.)

4. **Public Finance.** This course includes a classification of public expenditure, the industrial functions of the state, problems of American taxation with special attention to the need and methods of budgetary reform.

[Four hours a week for one term.]

5. **Distribution of Wealth.** Modern theories of rent, wages, interest and profits; a study based principally upon Ryan's "Distributive Justice" and Carver's "Distribution of Wealth."

[Four hours a week for one term.]

6. **The Principles of Economics.** A brief course covering the whole field of Economics, designed for students of Law, Engineering and Science.

[Four hours a week for one term.]

7. **The Elements of Transportation.** A discussion of steam railroad, electric railway, ocean and inland water transportations.

[Two hours a week for one term.]

8. **Industrial Organization and Combination.** A general survey of the development of the principal forms of business organization; the single entrepeneur system, the partnership, the joint stock company, the corporation; social and private advantages and disadvantages of each form. Causes leading to the rise and development of the trusts; the various forms of

combination; an examination of the remedies proposed for the solution of the problem.

[Three hours a week for one term.)

9. Business Law. This course is intended primarily for students of Journalism and Commerce. It deals briefly with contracts, negotiable instruments, sales, agency, partnership, property, corporations, bailments and carriers, suretyship and guaranty. It is an elementary course in law dealing particularly with those subjects that are more closely related to business and business administration. The student of Journalism will have special opportunity to acquaint themselves with the law of libel, the federal publicity law and likewise to become familiar with the principles of constitutional law and international law.

[Four hours a week for one term.]

10. Corporation Finance. A study of the corporation as a form of business organization, the organization of a business, the work of promoter and underwriter, the various kinds of securities, bases of capitalization, receiverships and reorganization.

[Four hours a week for one term.]

11. Labor Problems. Woman and child labor, the sweating system, immigration, poverty and unemployment, the labor union movement, methods of industrial peace and labor legislation are among the subjects studied.

[Four hours a week for one term.]

12. Socialism and Social Reform. This course treats socialism as a body of theory, a world-wide revolutionary movement, and as a proposed social re-organization; what is its essence, what are its affinities. A practicable program of social reform is worked out, and the inter-relations of Social Reform and Socialism are considered.

[Four hours a week for one term.]

13. Life Insurance. General principles of insurance; their development and application to modern business; organization forms, and technique of life insurance; a critical survey of the various kinds of obligations. Analysis of premium computation, the reserve, loading, surrender values, loans and surplus.

Property Insurance. Theory of risk and application to modern business; organization, forms, and technique of fire, marine, fidelity, Surety, Title and Credit Insurance.

[Three hours a week for one term.]

14. Commercial Geography. A study of land forms; climate and economic influences; economic and political geography of Latin America, Russia, Asia Minor, India and the Far East; manufacturing industries of the United States; industrial management. A study of cost factors and manufacturing policy. Trade areas and routes.

[Two hours a week for one term.]

15. Foreign Commerce. American and foreign industries; needs of foreign markets; foreign advertising, salesmanship, correspondence and distributing problems, forms and problems of international shipping; export management; marine insurance; foreign exchange. Lectures, text and practical problems. The work of the course is supplemented by the student Chamber of Commerce with weekly meetings.

[Four hours a week for two terms.)

16. Industrial History of England. The purpose of this course is to outline the important phases of the industrial history of England as distinct from its social and political problems. Special attention is given to problems associated with early rural and town life; early labor legislation; currency problems; the practical workings of early economic theories; factory legislation; modern forms of business organization.

[Two hours a week for one term.]

17. Industrial History of America. The treatment of this course is similar to that followed in Course 16. The history begins with the industrial life of the colonies during the time of British control. Other problems treated are: industrial conditions during the Revolution; Hamilton's report on manufactures; the growth of the tariff; internal improvements; economic phases of the Civil War; present-day problems.

[Two hours a week for one term.]

18. Banking. The nature and function of the bank; different kinds of banks; their obligation; their regulation; the Federal Reserve Act; banking forms and procedure.

[Two hours a week for one term.]

19. Credit. Nature and classes of credit; personal credit; commercial or mercantile credit; book accounts; trade acceptance; banking credit; instruments of banking; effect of credit on prices.

[Two hours a week for one term.]

20. Foreign Exchange. Meaning of foreign exchange; methods of buying and selling; transfers; bills of exchange; letters of credit, etc.

[Two hours a week for one term.]

21. Advertising. Psychology of advertising; advertising mediums; relation of advertising to distribution and price; its social influence; good and bad copy;

trade marks; elements in the advertising problem—the consumer, the commodity, the medium, competition, timeliness; publisher's responsibility for advertising; the ethical and the business view point.

[Three hours a week for two terms.)

22. Ocean Traffic and Trade. Function of ocean carriers, relations with public and with each other; pools and conferences; government aid to merchant marine; special problems of American shipping; ocean traffic and rates; marine insurance; ports and terminals; forms.

[Two hours a week for two terms.]

23. Contracts. Classification, offer and acceptance; consideration; frauds; joint and several contracts; discharge of contracts; defects.

[Five hours a week for one term.]

24. Chamber of Commerce. Seminar work in Commerce. Students are arranged in groups not exceeding fifty. Weekly reports covering different phases of business practice, current history, commercial legislation, commercial geography, marketing methods, statistics, business barometers, salesmanship, etc.

[One meeting a week for four years.]

25. Industrial Engineering. Principles of scientific management applied to shop and factory. Industrial organization and ownership, distribution of expense, management of labor, wage systems, welfare work.

[Five hours a week for one term.]

26. Commercial Algebra. Advanced course in Algebra with special reference to its use in investments, depreciation funds, insurance, and business problems generally.

[Five hours a week for one term.]

POLITICS

1. The Principles of Politics. This course treats of the origin, nature, functions and sanctions of the state, the various forms of government, and the relation between liberty and authority.

[Three hours a week for one term.]

2. American Government and Politics. Text, lectures, assigned topics; a study of the national, state, local and municipal governments.

[Four hours a week for one term.)

3. American National Government. An intensive study of the national government of the United States, based principally on the "American Republic" by Woodburn.

[Two hours a week for one term.]

4. American State Government. An intensive study of the American state governments, based principally on "State Government in the United States" by Holcomb.

[Two hours a week for one term.]

5. American City Government. A study of the American city, its governments and some of its problems and methods.

[Two hours a week for one term.]

6. Political Parties and Practical Politics. This course considers the characteristics, definition and functions of a political party; government by party; party platforms; party machinery, its uses and abuses; public opinion and popular government, and such devices as the initiative, referendum, recall and direct primaries.

[Two hours a week for one term.]

7. Governments of Europe. This course takes up a comparative study of the constitutions of some of the most important European states, Great Britain, Germany, France, Italy, Switzerland, and Austria-Hungary.

[Two hours a week for one term.]

8. Jurisprudence. A course covering (a) the outlines of the Science of Law. (b) The elements of International Law. (c) Lectures on selected topics of Roman and Canon Law. Lectures, readings, and examinations on required texts.

[Two hours a week for one term.]

SOCIOLOGY

1 (a). Outlines of Elementary Sociology. Ethical considerations of the individual precede the course proper. To establish social ideals it is first necessary to establish the ideals of the individual. The nature and end of man. Then follows an analysis of society. Social forces, social laws. Principles of social control. Social inequalities. The nature, end and aims of society.

1 (b). Social Ethics. Traditional and modern ethics examined in relation to present day social problems. The ethical content of social legislation. Natural law and natural rights. Individual and social aspects of rights and duties in general.

[Four hours a week for one term.]

2. The Family. Its organization and life; effects of economic and social changes upon the family and the home; disorganization of the modern family through divorce and race suicide; the subnormal family and its rehabilitation.

[Four hours a week for one term.]

3. Problems of Poverty. Nature, extent, types and causes of poverty are studied. Special study of types of poverty that are socially preventable. Remedial and preventative measures. Social insurance. Ideals and attainments of organized charities.

[Four hours a week for one term.]

4 (a). Social Pathology. Several pathological conditions are studied but special attention is given to such conditions and facts as are of special interest to the student of law.

4 (b). Delinquency. Crime, Punishment. In connection with the course in social pathology. Crime. Brief histoory of criminology. Some sociological aspects of crime. Theories of punishment. In this course special attention is given to the mental and moral delinquent. Psychopathic tests for the juvenile and adult offender. Special study of the "Individual Delinquent," by William Healy.

[Four hours a week for one term.]

Graduate Work. Advanced courses in economics, politics and sociology are provided for graduate students who wish to receive the degree of Master or Doctor.

ZOOLOGY

1. This course aims to give a general survey of the animal kingdom. Particular emphasis is given to classification, internal and external anatomy, life history, habits and distribution of animals.

[Three hours a week for two terms.]

2. This is the laboratory course to accompany Zoology 1. Special attention is paid in this course to external and internal anatomy. Each student is required to examine and dissect twenty-five specimens, and to determine about forty species, principally Mollusca and Arthropoda. The course is designed to train the student in laboratory technique, and in correct observation and interpretation of facts of anatomy and vital phenomena.

[Two laboratory hours a week for two terms.]

3. Lectures, recitations, conference and laboratory. This course is intended both as introduction to and preparation for research. Prerequisite: Zoology 1 and 2.

An intensive study dealing with the comparative anatomy, development and phylogeny of the invertebrates and the vertebrates not considered in courses 1 and 2.

This course, moreover, includes:

(*a*) The study of one or two types of skeletons belonging to each order of mammalia as outlined in Kirsch's "Elementary Course in Mammalian Osteology."

(*b*) A thorough study of mammalia with reference to the cat, which course is mainly anatomical in nature.

(*c*) An outline of comparative embryology of animals.

[Recitations: Two hours a week for two terms.)
[Laboratory: Four hours a week for two terms.]

SEVENTY-FIFTH ANNUAL COMMENCEMENT

JUNE 9, 1919.

The Degree of Doctor of Laws was conferred:

On a distinguished specialist in a delicate and difficult department of medicine, whose professional labors have brought fame to his city and whose benefactions to the poor through gratuitous service have endeared him to his fellowmen, Dr. Frederick Nathaniel Bonine, of Niles, Michigan;

On an exemplary religious, whose genius is as brilliant as his virtues are conspicuous and who represents in his devotion to religion and art the most beautiful traditions of the Ages of Faith, Dom Gregory Gerrer, of the Order of St. Benedict;

On a successful physician, a distinguished naturalist and an explorer of international repute, who has made notable contributions to the geographical knowledge of South America, Dr. Edwin Ruthven Heath, of Kansas City, Kansas.

The Degree of Master of Laws was conferred on:

Arthur Lawrence May, South Bend, Indiana;—Thesis: "Ultra-Vires Contracts of a Corporation."

The Degree of Bachelor of Arts was conferred on:

Thomas Francis Butler, Belvidere, Illinois.
Donald Patrick MacGregor, Brantford, Ontario, Canada.
James Harold McDonald, Galesburg, Illinois.
John Stephen Roche, Limerick City, Ireland.

The Degree of Bachelor of Letters was conferred on:

Philip Vincent Beaghan, Springfield, Illinois.
Brother Edmund, C. S. C., Notre Dame, Indiana.
Francis Sylvester Wyss, Fort Wayne, Indiana.

The Degree of Bachelor of Philosophy was conferred on:

Edwin Walter Hunter, South Bend, Indiana.

The Degree of Bachelor of Philosophy in Journalism was conferred on:

George Dewey Haller, Sault Ste Marie, Michigan.

The Degree of Bachelor of Science was conferred on:

Martin William Lammers, Jackson, Michigan.
Theodore Charles Rademaker, Marion, Indiana.

The Degree of Bachelor of Science in Pharmacy was conferred on:

Bernardo Restrepo, Medellin, Colombia, S. A.

The Degree of Civil Engineer was conferred on:

Patrick Joseph Murray, Holly, New York.

The Degree of Mechanical Engineer was conferred on:

Louis Pardue Doyle, Brooklyn, New York.
Joseph Francis Lindeman, Troy, Indiana.
James Emmett McGuire, Fowler, Indiana.
Melchior Stanislaus Niemer, South Bend, Indiana.
Augustin Otero, Havana, Cuba.

The Degree of Electrical Engineer was conferred on:

John Francis McCarthy, Butte Montana.
James Michael McNulty, Scranton, Pennsylvania.
Edward James O'Connor, Louisville, Kentucky.
James Michael Reid, Lancaster, Ohio.
Humberto Maximilian Rivas, Santa Tecla, Republic of Salvador, C. A.

The Degree of Bachelor in Architecture was conferred on:

Everett Augustus Blackman, Paris, Illinois.
Columbus Conboy, Alexandria, Indiana.
Maurice John Carroll, Kansas City, Missouri.
Bernard Clairvaux McGary, Ashtabula, Ohio.

The Degree of Bachelor of Laws was conferred on:

Charles Norbert Baglin, Rochester, New York.
James Joseph Connolly, Peru, Illinois.
Paul Fenlon, Blairsville, Pennsylvania.

Louis John Finske, Michigan City, Indiana.
Harry Francis Godes, Preston, Iowa.
Aaron James Halloran, Springfield, Ohio.
Louis Vincent Harmon, Auburn, New York.
Verdin Hoarty, Streator, Illinois.
Emmett John Kelly, Ottawa, Illinois.
William Henry Kelly, McCordsville, Indiana.
Charles Joseph McCauley, Memphis, Tennessee.
Andrew Leo McDonough, Plainfield, New Jersey.
Joseph Cyril McGinnis, Rock Island, Illinois.
Paul Joseph Ryan, Johnstown, Pennsylvania.
Armand Schellinger, Mishawaka, Indiana.
Joseph Marshall Suttner, Spokane, Washington.
August Aloysius Van Wonterghen, Moline, Illinois.

The Degree of Pharmaceutical Chemist was conferred on:

James Willard Hosking, Lansing, Michigan.

The Certificate for the Short Course in Commerce was conferred on:

Clarence Wagner Bader, Whiting, Indiana.

The Certificate for the Short Course in Mechanical Engineering was conferred on:

Roe S. Tappan, New Carlisle, Indiana.
Robert Caldecott Wright, Woodstock, Illinois.

DEGREES CONFERRED AT THE END OF THE SUMMER SESSION, 1919:

The Degree of Civil Engineer was conferred on:

Timothy E. Quinlan, Lima, Ohio.

The Degree of Electrical Engineer was conferred on:

Robert Edward Huber, South Bend, Indiana.

Th Degree of Chemical Engineer was conferred on:

Mark Gerard Eilers, Rochester, New York.

The Degree of Bachelor of Laws was conferred on:

James Emmett Costello, Anderson, Indiana.
Hugh Thomas Lavery, Bridgeport, Connecticut.

PRIZE MEDALS

The Quan Gold Medal, presented by the late William J. Quan, of Chicago, for the student having the best record in classical program, senior year, was awadred to Thomas Francis Butler, Belvidere, Illinois.

The Meehan Gold Medal, the gift of Mrs. Eleanor Meehan, of Covington, Kentucky, for the best essay in English (senior) was awarded to George Dewey Haller, Sault St. Marie, Michigan;—Subject: "The Literary Aspects of the Celtic Renaissance."

The Dockweiler Gold Medal for Philosophy, founded in memory of his deceased father by Mr. Isidore Dockweiler, of Los Angeles, California, for the best essay on some philosophical theme, senior year, was awarded to James Harold McDonald, Galesburg, Illinois;—Subject: "Art and Morality.'

The Mariano Placio Caparo Gold Medal for Electrical Engineering, founded in memory of his deceased father by Jose Angel Caparo, of the class of '08, for the best record in all the courses prescribed in the four-year program of electrical engineering, was awarded to Humberto Maxamilian Rivas, Santa Tecla, Republic of Salvador, C. A.

The Breen Gold Medal for Oratory, presented by the Honorable William P. Breen, of the class of '88, was awarded to Cornelius Raymond Palmer, Chicago. Illinois.

The Barry Gold Medal for Public Speaking, presented by the Honorable P. T. Barry, of Chicago, was awarded to William Cornelius Havey, Indianapolis, Indiana.

Ten Dollars in Gold for Sophomore Oratory, presented by Mr. John S. Hummer, of the class of '91, was awarded to Michael Joseph Tierney, Rochester, New York.

Ten Dollars in Gold for Freshman Oratory, presented to Mr. Hugh O'Neill, of the class of '91, was awarded to Leo Ward, Melrose, Iowa.

LIST OF STUDENTS

REGISTERED IN THE YEAR 1919-20

Abbott, Joseph Omer	Colorado
Abrams, Alfred Robert	Indiana
Adams, Walter Marcus	Kentucky
Agatho, B.	Ohio
Allen, William Sheridan	Illinois
Alphonse, B.	Indiana
Ambrose, John Horace	Maine
Anaya, Alfonso	Mexico
Anderson, Edward Nicholas	Iowa
Anderson, Heartley William	Michigan
Andrew, B.	Illinois
Andrews, Roger Gardner	Wisconsin
Angermeier, Arthur Gerst	Kentucky
Anleitner, Harry Joseph	Missouri
Antill, Eugene Cornelius	Texas
Applegate, Edward Hawkins	Colorado
Arends, Robert Goldman	Missouri
Arndt, Karl Matthews	California
Ashe, Gerald Alphonse	New York
Atkinson, Henry Stephen	Wisconsin

Bachman, George	Michigan
Bahan, Leonard Finlan	Texas
Baiano, Salvini James	California
Bailey, James Harvey	Ohio
Bailey, Edward Riley	Pennsylvania
Baine, Charles	Massachusetts
Baker, William Roger	Massachusetts
Baldwin, George Jesse	Indiana
Balfe, John Thomas	New York
Ballard, William Matthew	Indiana
Bardzil, Kleoras Norbert	Pennsylvania
Barlow, William Lawrence	Indiana
Barnhart, Henry Fahey	Ohio
Barr, Karl Joseph	Oregon
Barrett, Charles Richard	Indiana

Barry, George Francis	Illinois
Barry, Gerald William	Illinois
Barry, Norman Christopher	Illinois
Barry, Paul	Iowa
Barry, Thomas William	Kentucky
Barth, William Anton	Pennsylvania
Barton, Joseph	New York
Baumer, Fritz Herman	Illinois
Beacom, Thomas	Illinois
Beamer, Harry Scholfield	Indiana
Behan, Joseph Bernard	Michigan
Bell, David Albert	Pennsylvania
Bell, James Xavier	Illinois
Berg, Harold Walter	Indiana
Berger,, Leo	Iowa
Berger, Paul Francis	Iowa
Berghoff, Edward Herman	Indiana
Bergman, Ralph William	Iowa
Bergman, Arthur Joseph	Indiana
Bernands, Martin	Oregon
Besanceney, Marion Gerard	Ohio
Bielicki, Stanislaus	Indiana
Binyon, Eugene Orrick	Texas
Birmingham, Joseph Louis	New York
Bittner, Herman	Michigan
Blanco, Victor	Mexico
Blasius, Frank Charles	Ohio
Blievernicht, Jerome David	Illinois
Bloemer, Frank Bernard	Kentucky
Blumberg, Thadeus	Indiana
Boley, John Henry	Minnesota
Bolger, Henry Joseph	Wisconsin
Borowinski, Paul	Illinois
Bowden, Harold Sidney	Missouri
Boyer, John Stanley	Indiana
Boyle, Thomas Edward	Massachusetts
Boza, Andres Malatesta	South America
Bradbury, James Stanley	Illinois
Brady, John Paul	Kentucky
Brandy, Joseph Ralph	New York
Bradley, Francis Patrick	Pennsylvania

Bray, Anthony Thomas	Ohio
Breen, Francis Joseph	Ohio
Breen, Lloyd	Wisconsin
Breen, Paul	New York
Brennan, Martin Hogan	Indiana
Briley, John Anthony	Pennsylvania
Brosman, John Dunstan	Indiana
Brown, Charles Lawton	Indiana
Brown, James Reedy	Kentucky
Brown, Max Jacob	Indiana
Brown, Vincent Joseph	New York
Brown, William Henry	Indiana
Brubaker, Gerald Clement	Indiana
Bryce, Alfred Lyndon	New Jersey
Buckley, John Joseph	Ohio
Buechner, Frederick William	Indiana
Burke, Charles Francis	Massachusetts
Burke, Emmett Francis	Illinois
Burke, Geoffrey Cullen	New York
Burke, John William	Massachusetts
Burns, Charles Wilmer	Indiana
Burns, William Wayne	Illinois
Bushman, Edward Clarence	Indiana
Bustamente, Louis	South America
Butine, Arthur	Michigan
Butterfield, George Leo	Pennsylvania
Butterworth, Charles Edward	Indiana
Byrne, Edwin John	Mississippi

Cain, Giles Leo	Illinois
Call, Leonard Mooney	Michigan
Callahan, Nelson James	Ohio
Callan, J. Lawrence	Pennsylvania
Campbell, Philip Joseph	Kentucky
Carberry, Glen Michael	Iowa
Carey, Irving Walter	Wisconsin
Carmody, James Andrew	Michigan
Carmody, James Edward	Louisiana
Carmody, Stephan Eugene	Illinois
Carney, Bernard	Ohio
Carr, Daniel Joseph	Pennsylvania

Carroll, Albert	Indiana
Carroll, John Warren	Wisconsin
Carroll, William Joseph	Iowa
Cartier, George Edmund	Michigan
Casasanta, Joseph John	Massachusetts
Casey, John Patrick	New Jersey
Castellini, William Augustine	Ohio
Castner, Paul Henry	Minnesota
Cava, Jasper Francis	Ohio
Cavanaugh, John Joseph	Michigan
Cavanaugh, John Malachi	Ohio
Cavanaugh, Vincent	New York
Champion, Pierre	Ohio
Chapla, John Paul	Ohio
Chaplin, Daniel Edward	Pennsylvania
Chase, John Randall	Indiana
Chaussee, Ephren Louis	Michigan
Chesnow, Louis	Michigan
Chisholm, Frank	Missouri
Christner, John Richard	Indiana
Clancy, John Edward	Illinois
Clancy, James Francis	Illinois
Clancy, John Newman	Michigan
Clark, David Worth	Oregon
Clark, Ernest	Indiana
Cleary, Gerald Joseph	Michigan
Clements, Menefee Richard	Kentucky
Clerkin, Gerald Paul	Ohio
Clohessy, Francis	New York
Clunk, Roy Herman	Ohio
Cochrane, John Charles	Ohio
Colgan, Alexander Johnston	Pennsylvania
Collins, Elmer Joseph	Michigan
Comeau, Arthur Nicholas	Massachusetts
Comisky, Edward Joseph	Illinois
Conaghen, Paul Roscoe	Illinois
Condon, Walter Thomas	Illinois
Conley, William John	Ohio
Conly, Gregory Michael	New York
Conness, William Joseph	Wisconsin
Connelly, Frank Daniel	New York

Connelly, Francis William	Canada
Connerton, James William	New York
Connery, John Joseph	Illinois
Connor, Benedict Aloysius	Illinois
Connor, John Vincent	Illinois
Connors, William Joseph	Illinois
Conrad, Raymond John	Wisconsin
Conway, Walter Knox	Illinois
Conway, John	Oklahoma
Cook, Laurens	Illinois
Cooke, Thomas Edward	Illinois
Cooney, Ralph Martin	Michigan
Cordray, Richard Edmund	Texas
Corrigan, Francis Leo	Texas
Coryn, John Ralph	Illinois
Cotton, Forest George	Illinois
Coughlin, Daniel Martin	Minnesota
Coughlin, Francis Edward	Illinois
Cowen, John Aloysius	New York
Conrad, Raymond John	Wisconsin
Craugh, Gerald	New York
Crawford, James Bernard, Jr.	Alabama
Crockett, Harrison Heiser	Indiana
Cromling, Francis Adelbert	Michigan
Cronk, Eugene Duncan	Missouri
Crowe, Martin Joseph	Missouri
Crowell, John William	Texas
Crowley, Charles Ambrose	Massachusetts
Crowley, Jeremiah Glen	Oklahoma
Crowley, Paul Walter	Massachusetts
Croze, Wilfrid	Minnesota
Cudahy, Dennis Murphy	Indiana
Cuddihy, John Gerald	Michigan
Culhane, John Daniel	New York
Culhane, John Herbert	Illinois
Culkin, John Louis	Illinois
Cullen, Harry James	New York
Cullen, John Paul	Wisconsin
Culligan, James Alphonse	Iowa
Curran, Kevin Edward	Missouri
Curtain, Egbert Leo	Massachusetts

Cusick, Alden John	Wisconsin

Dacy, Maurice James	Kansas
Daily, Gerald John	Oklahoma
Daily,William Joseph	Pennsylvania
Daly, William Joseph	Ohio
Dant, Maurice Nicholas	Kentucky
Dant, Philip	Kentucky
Davis, Charles	Indiana
DeCourcey, Edward	Illinois
Dee, Joseph Roy	Iowa
DeGree, Edward George	Minnesota
DeGree, Walter Bernard	Minnesota
DeGuere, Robert McArthur	Wisconsin
Delaney, Joseph Patrick	Pennsylvania
Dempf, Henry Randall	Kentucky
Dempsey, John Thomas	Illinois
Dennis, Robert Myron	Illinois
Denny, Harry Edward	Connecticut
Derrick, John Victor	Pennsylvania
Desch, August	New Jersey
deSmet, Louis Aldred	Illinois
Desmond, Joseph Leo	Massachusetts
de Tarnava, Constantine	Mexico
Dettling, John Alfred, Jr.	Ohio
Dettlinger, Herman Anthony	Indiana
Dever, George Anthony	Illinois
Devers, Jerome Aloysius	Pennsylvania
Devine, James Thomas	Illinois
Diedrick, Arthur Joseph	Illinois
Disney, Francis Xavier	New York
Dixon, Jerome Francis	Illinois
Dixon, John Sherwood	Illinois
Dolan, James Christopher	Illinois
Dollard, Thomas Vincent	New York
Doll, Clifford William	Kentucky
Donahue, James	Massachusetts
Donahue, Vincent John	Ohio
Donaldson, Joseph Francis	Indiana
Donata, Mariano	Philippine Islands
Donnelly, Edwin Charles	Indiana

Donnelly, Joseph Michael	Ohio
Donovan, William Edward	Massachusetts
Dooley, James Ryan	Massachusetts
Doorley, John Edward	Illinois
Doran, Joseph	New York
Doran, Michael Edward	Indiana
Doran, Patrick Charles	Ohio
Dore, Clarence	Illinois
Dore, Francis Homer	Washington, D. C.
Dore, Richard Stanley	Washington, D. C.
Doriot, Frank Sylvester	Indiana
Dorsey, Frank James	Washington, D. C.
Dorsey, William Joseph	Kentucky
Dorwin, Milan Murray	Wisconsin
Douglas, Walter Joseph	New York
Dower, James Patrick	New York
Doyle, Edward Brennen	Indiana
Dressel, Fred	Iowa
Drummey, Frank	Wisconsin
Duffey, Joseph Edmund	Ohio
Duffy, Arthur William	Wisconsin
Duffy, Daniel	Ohio
Duffy, Thomas Calasanctius	Rhode Island
Dugan, Earl Edward	Kentucky
Dugan, Paul Riley	Missouri
Duncan, Archibald Milton	Wisconsin
Dundan, Edward Joseph	Michigan
Dumke, Ralph Ernest	Indiana
Dunn, Charles	South Dakota
Dunn, Leo James	Illinois
Dunne, Cyril Martin	Illinois
Dupuis, Silas Arthur	Michigan
Dwyer, Wilfred Thomas	Ohio

Easley, Donald James	Nebraska
Eckerle, William Paul	Kentucky
Eddy, Willard Jerome	Illinois
Edmondson, Delmar	Ohio
Egan, Charles Michael	Indiana
Eligius, B.	Wisconsin
Engels, Vincent David	Wisconsin

Enright, Paul Leo	Ohio
Ernest, B.	Ohio
Ernst, Bertram Edward	Illinois
Espinosa, Julio	South America
Espinosa, Lazaro	South America
Fagan, Vincent Francis	Massachusetts
Faherty, Richard Joseph	Indiana
Fahey, Michael Edward	Pennsylvania
Falvey, Richard Joseph	Illinois
Farley, Daniel	Illinois
Farley, Joseph	Illinois
Farley, William Russell	Minnesota
Farrell, Hugh John	New York
Farrington, Francis Sherman	Wisconsin
Farwick, Arthur Francis	Ohio
Feen, William Patrick	Massachusetts
Feeney, Francis James	Indiana
Fenelon, John Patrick	Iowa
Ficks, Albert, Jr.	Ohio
Field, John William	Kentucky
Figge, Vivian Otto	Iowa
Finfrock, Rodney	Ohio
Fischer, Carl Theodore	South Dakota
Fites, Cyril Bernard	Indiana
Fitzgerald, Eugene Martin	Indiana
Fitzgerald, John Dean	Illinois
Fitzgerald, James Edward	Indiana
Fitzgerald, Thomas Frederick	New York
Fitzgerald, William James	Illinois
Fitzgerald, William Terence	Indiana
Fitzgibbon, Donald Thomas	Iowa
Fitzpatrick, George Michael	Michigan
Fitzsimmons, Frank Thomas	Illinois
Flannery, Harry William	Maryland
Fleming, Michael Edward	Illinois
Flick, Joseph Henry	Ohio
Flinn, Neil William	Wisconsin
Flood, Leo Francis	Pennsylvania
Flynn, John Richard	New York
Fogarty, John Thomas	Indiana

Foley, Bernard Bryan	Indiana
Foley, Charles	Oregon
Foley, Daniel Francis	Kansas
Foley, William Edward	Indiana
Foller, Cyril	Pennsylvania
Foote, Mark Anthony	Illinois
Foren, James Simon	Wisconsin
Forster, Herbert Elbel	Indiana
Foster, Merril	Indiana
Fox, William Francis	Indiana
Franciscovich, Frank	Oregon
Frederick B.	Vermont
Fredrickson, Edwin Andrew	Indiana
Freese, Leo Wellington	Indiana
Fricke, Lewis John	Indiana
Fritz, Henry William	Illinois
Furey, William James	Indiana

Gaffney, Cyril Francis	Connecticut
Gallagher, Frederick Warren	Oklahoma
Gallagher, Raymond Mannus	Iowa
Gallagher, Robert Emmett	West Virginia
Gallardo, Joseph Joachim	Central America
Galloway, Robert	New York
Galloway, Robert	Indiana
Galloway, Nixon Berton	Indiana
Galvin, Francis Joseph	Indiana
Garfield, Harold Fleming	Indiana
Gartlan, Bernard Joseph	Illinois
Garvey, Arthur Aloysius	Massachusetts
Gaynor, William Cornelius	Wisconsin
Gerard, B.	Ohio
Gessler, Paul Lawrence	Indiana
Gibasiewicz, Leonard Peter	Illinois
Gibbons, Hugh Thomas	Iowa
Gibbons, Richard	Illinois
Giddings, Eugene	Michigan
Gies, Frederick Albert	Michigan
Gillen, James Simon	Wisconsin
Gillis, Francis Harry	Pennsylvania
Gilmore, Roman	New York

Giorgi, Paul	Indiana
Gipp, George	Michigan
Glahe, Frederick William	Illinois
Gleason, John Willard	Michigan
Glenn, John Randell	Indiana
Glotzbach, Linus Charles	Minnesota
Glueckert, Frederick Richard	Indiana
Goessling, Gerald August	Missouri
Goldcamp, Lawrence Henry	Ohio
Goldcamp, Silvinus	Ohio
Gonzales, Joseph	Cuba
Gonzales, Rafael Joaquin	Philippine Islands
Goodall, Frank	Ohio
Gooley, Malachy Patrick	New York
Gorman, Anthony Jerome	Canada
Gorilla, Lawrence Vincent	Michigan
Gould, Edward William	Illinois
Grabner, Henry Charles	Indiana
Grace, John Leo	Indiana
Graner, Lawrence	Pennsylvania
Granfield, John James	Massachusetts
Granfield, Patrick Edward	Massachusetts
Gratchen, Edward Joseph	Ohio
Griffin, Bart Joseph	Massachusetts
Griffin, Charles Edward	Massachusetts
Grimes, Charles Aloysius	Rhode Island
Grinager, Haavel Ambrose	Minnesota
Grinager, Paul Augustine	Minnesota
Grooms, William	Indiana
Guerin, Gerald Brian	New York
Guether, John Reynolds	Missouri
Guler, Joseph Louis	Indiana
Gurza, Javier	Mexico

Hagan, Gerald John	Montana
Hagerty, Clement Daniel	Indiana
Hagerty, Leo Francis	Indiana
Hagerty, William James	Indiana
Hahler, John James	Nebraska
Hall, Forest	Indiana
Hallett, Irving Luke	Michigan

Halloran, Francis	Ohio
Halloran, John Felix	Montana
Hamilton, George Raymond	Indiana
Hamm, Frank Culeman	Nebraska
Hampton, Clifton Delois	Indiana
Hand, James Leslie	New York
Handelsman, J. Henry	Indiana
Haney, Bernard Edward	Indiana
Hanan, Paul Bernard	Wisconsin
Hamon, Frank	Wisconsin
Hanrahan, Vincent Joseph	New York
Harbecke, Cyril	Illinois
Harkness, John Clifton	Illinois
Harold, B.	Ohio
Hart, John Patrick	Ohio
Hartford, John William	Michigan
Hartman, Cyril Joseph	Indiana
Haskins, William	Indiana
Hassenauer, Leo Joseph	Ohio
Hauser, Eugene Wenceslaus	Iowa
Havey, William	Indiana
Hayes, Cornelius Joseph	Indiana
Hayes, David Vincent	Connecticut
Hayes, William Daniel	Massachusetts
Haynes, Harold Fabien	Missouri
Hazinski, Miecislaus	Indiana
Hearn, Robert James	Ohio
Heffernan, John Francis	Ohio
Hegarty, John Joseph	Massachusetts
Heidelman, Eugene Joseph	Indiana
Heimann, Joseph Vincent	Ohio
Heinrich, Wolfgang Amadeus	New York
Henanghan, Bryan	Illinois
Heneghan, George Philip	Illinois
Henneberry, Joseph Patrick	Illinois
Herbert, Edward Charles	Iowa
Herzog, Julius Theodore	Texas
Hess, James Leander	Illinois
Higgins, John Tilson	Indiana
Hilkert, Emil John	Ohio
Hill, Robert Buford	Indiana

Hillyer, St. George	Colorado
Hillyer, Granby	Colorado
Hindelang, Mark Gregory	Nebraska
Hines, Eugene Mark	Indiana
Hirschbuhl, Charles Joseph	Oregon
Hoar, Gerald Jeremiah	Illinois
Hoen, Frederick William	Ohio
Hoffman, Harry John	Indiana
Hogan, Edward James	Ohio
Holden, John Edward	Texas
Holloran, Ray Joseph	Wyoming
Holmberg, Bruce John	Illinois
Holmberg, Elmer Thomas	Illinois
Holmes, Richard	Indiana
Holton, James Barry	Texas
Hood, Robert Emmett	Idaho
Hope, Arthur Barry	Illinois
Hope, John Meade	Illinois
Horton, Joseph Cornelius	Indiana
Howard, Thomas Patrick	California
Howden, Francis	Illinois
Huaman, Filiberto	South America
Huether, Charles Augustus	Pennsylvania
Huether, John Jacob	Pennsylvania
Hughes, Frank	Illinois
Huguenard, Aaron Henry	Indiana
Hunt, Hiram Henry	Iowa
Hunter, Arthur Burton	Indiana
Hunter, Edwin Walter	Indiana
Hyland, Justin Edward	New York
Jackson, Anthony Myers	Illinois
James, John Joseph	Illinois
Jamieson, Thomas Crawford	New Jersey
Jankowski, Chester Louis	Indiana
Jenney, John Abraham	Ohio
Johnston, Joseph Herbert	Idaho
Johnston, Elmer Edward	Idaho
Jolly, John Ryan	Rhode Island
Jones, Austin David	Iowa
Jones, James Vincent	New York

Jones, Royal Gerald	Illinois
Jordan, James Patterson	South Dakota
Judge, William	Iowa
Justin, B.	Ohio

Kane, Joseph Ingersoll	Illinois
Kane, John	Wisconsin
Kane, Michael George	Massachusetts
Karr, Edward Francis	Illinois
Kasel, Emil James	Ohio
Kasper, Thomas Cyril	Minnesota
Kaullen, Frederick Adam	Missouri
Kean, Leo Vincent	Nebraska
Kearney, Harold W.	New York
Kearns, Raymond John	Indiana
Keefe, Thomas Leo	Indiana
Keegan, Emmett	Kentucky
Keegan, James Vincent	Massachusetts
Keenan, Frederick Godfrey	Indiana
Keenan, Hubert	Wyoming
Keeney, Arthur Charles	Ohio
Kellett, Cyril Francis	Massachusetts
Kelley, Leo Daniel	New York
Kelly, Edward Daniel	Iowa
Kelly, Edward Joseph	Illinois
Kelly, Francis	Connecticut
Kelly, Francis Kerman	Michigan
Kelly, Frank William	Indiana
Kelly, Thomas Armond	Illinois
Kelly, Thomas Francis	Iowa
Kelly, Terence Peter	Iowa
Kennedy, Eugene Martin	Indiana
Kennedy, Francis John	Iowa
Kennedy, Lester Joseph	Massachusetts
Kennedy, Walter John	Iowa
Kenny, John Walter	Illinois
Kerver, George Gabriel	Ohio
Kervan, Paul James	Indiana
Kiley, Joseph Roger	Illinois
Kiley, Philip James	Indiana
Kilian, B.	Ireland

Kinerk, Louis Ormond	Indiana
King, Cameron	Idaho
King, Charles Joseph	Illinois
Kinney, George Leo	New York
Kirk, Bernard Charles	Michigan
Kirwan, John Ryan	Wisconsin
Klauer, Walter Edward	Iowa
Kline, Clarence Joseph	Pennsylvania
Klingbiel, Ray Irvin	Illinois
Koebel, Martin	Michigan
Kolars, John Francis	Minnesota
Kolcum, Michael Aloysius	Ohio
Konzen, Lawrence Anthony	Ohio
Kramer, John Edward	New York
Kraus, John Robert	Ohio
Kreimer, Edward	Minnesota
Krippene, Kenneth William	Wisconsin
Kundtz, Joseph Ernest	Ohio

Lagan, Randall Clifford	Indiana
Lalley, Edward Joseph	South Dakota
Lally, Lenihan	Iowa
Langston, Donnelly	Nebraska
La Ponse, Charles Gabriel	Michigan
Larrazolo, Octaviano Ambrosio	New Mexico
Larson, Frederick Adolphus	Michigan
Latham, Kirk Edgar	Kansas
Lauerman, Henry Joseph	Wisconsin
Laux, Herman John	Montana
Lawless, William Francis	Delaware
Leach, Buron	Indiana
Leahy, Thomas Francis	Massachusetts
Lee, Ralph Arthur	Iowa
Lee, Thomas Joseph	Iowa
Lennon, Edward Joseph	Indiana
LePine, Gerald John	New York
Lequerica, Robert	South America
Leslie, Humphrey Louis	Iowa
Lewis, Edward Raymond	New York
Libby, William Thomas	Rhode Island
Lightner, John Edward	New York
Lilla, Robert Stephen	Massachusetts

Lillis, Thomas Harold	Massachusetts
Lintz, Clinton Joseph	New York
Lisewski, Stanley	Illinois
Lish, Peter Francis	North Dakota
Livington, Frank Michael	Pennsylvania
Locke, Lucien Post	Oklahoma
Lockwood, Alexander John	New York
Lodyga, Casimir	Indiana
Loftus, John Joseph	Idaho
Logan, Felix Leslie	Indiana
Loosen, Julius Paul	Oklahoma
Lord, Maurice Powers	Indiana
Louys, George Constant	Ohio
Lovett, Leo Jodisah	Pennsylvania
Lujan, Louis Carlos	New Mexico
Lynch, Arthur Thomas	Massachusetts
Lynch, Cletus Emmett	Connecticut
Lynch, Daniel David	Indiana
Lyness, Leland	North Dakota
Lynn, Joseph Rodgers	Oklahoma
Lyons, James Frederick	Washington

McAllister, Charles	Indiana
McBarnes, Rex Regius	Iowa
McCabe, Clarence James	Nebraska
McCabe, John Nicholas	Nebraska
McCabe, James Robert	Indiana
McCabe, Spencer	Illinois
McCaffery, Bernard Joseph	Indiana
McCaffery, Paul Joseph	Indiana
McCarthy, Edwin James	Kansas
McCaffery, Ralph John	New York
McCarthy, George Francis	Massachusets
McCarthy, Ricard Wilton	Illinois
McCormick, Richard Henry	Illinois
McCormick, Harry Joseph	South Dakota
McCullough, Henry Mitchell	Iowa
McDermott, William Emmett	Massachusetts
McDonald, William Ted	Idaho
McEllin, Edward Joseph	Nevada
McEniry, Matthew Dennis	Colorado

McFeeley, Edward William	New Jersey
McGarry, Raymond Aloysius	Ohio
McGarty, Leo John	Wisconsin
McGlynn, Robert Emmett	Illinois
McGrath, Arnold John	Illinois
McGrath, Edward Frank	Kentucky
McGrath, William Joseph	Illinois
McGraw, David John	Iowa
McGuire, Francis William	Pennsylvania
McGuire, Maurice Gerald	Illinois
McHale, Thomas George	Nebraska
McHugh, Owen Paul	Oklahoma
McIntire, Thomas Stephen	Massachusetts
McIntyre, Walter Joseph, Jr.	Indiana
McKee, Harold Earl	Illinois
McKeown, Joseph Patrick	Mississippi
McLellan, Harry James	Colorado
McLoughlin, William Navarre	Michigan
McMahon, Edward Carroll	Indiana
McNamara, Cornelius	Montana
McNamara, Edwin Lally	Ohio
McNamara, Thomas Harry	Wyoming
McNeff, James Joseph	Illinois
Maag, Joseph Mark	Indiana
Mac Donald, Donald James	Minnesota
Mack, John Grant	Indiana
Madden, Joseph Bernard	Michigan
Madero, Gustavo Adolfo	Mexico
Madigan, Edward Patrick	Illinois
Maguire, Patrick	Utah
Maher, Joseph Aloysius	Indiana
Mahoney, Leo Aloysius	Iowa
Mahoney, Michael Joseph	New York
Maiocco, John Paul	Connecticut
Malone, Grover John	Illinois
Mangan, Michael Aloysius	Ireland
Manion, Clarence	Kentucky
Mann, Frederick	Illinois
Mannix, James Leo	Indiana
Martin, Charles Michael	Michigan
Martin, James Edward	Illinois

Martin, James Redmond	Illinois
Martin, Joseph John	Massachusetts
Martin, Jerome Patrick	Wisconsin
Mascott, Louis	Mexico
Matthes, Walter John	Indiana
Meagher, Bernard Francis	Illinois
Megher, Edmund Joseph	Indiana
Meegan, Thomas Vincent	New York
Meehan, Edward John	Pennsylvania
Meehan, John Joseph	New York
Meersman, Joseph Clarence	Illinois
Mehre, Harry James	Indiana
Melody, Felix Joseph	Ohio
Mendoza, Dionisio Ignacio	South America
Meredith, George	New Jersey
Mersman, Cyril Albert	Ohio
Metzger, Leo Russell	Indiana
Meuser, Joseph Alvin	Iowa
Meyers, John Sinnott	Kentucky
Michael, B.	Michigan
Milam, James William	Kentucky
Miles, John Francis	Missouri
Mileski, Frank Joseph	Michigan
Miller, Callix Edwin	Indiana
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Miller, Franklyn Elliot	Iowa
Miller, Howard	Ohio
Miller, John Milton	Illinois
Miller, Lyle Edward	Indiana
Miller, Walter Reilly	Ohio
Miller, William Eric	Indiana
Miner, William Anthony	Pennsylvania
Mixson, Leo Joseph	Texas
Moelter, Leo Joseph	Ohio
Mohardt, John Henry	Indiana
Mohrfeld, Wilfrid Otto	Iowa
Momsen, Leo John	Texas
Monahan, Clement Le Roy	Iowa
Monroe, Howard James	Wisconsin
Montague, John Michael	Illinois
Montenegro, Pio	Philippine Islands

Mooney, Charles	Tennessee
Moore, Arthur James	Ohio
Moore, Elwyn Michael	Illinois
Moore, Louis Franklin	Illinois
Moore, Philip Samuel	Illinois
Moran, Charles Thomas	Kentucky
Moran, John Francis	Ohio
Morency, Henry	Michigan
Morgan, Anthony Clare	Illinois
Morgan, Lawrence	Illinois
Morrison, Charles Welstead	Illinois
Morrissey, Leonard William	Wisconsin
Motier, Frank Bernard	Iowa
Moynihan, Andrew Joseph	Indiana
Moynihan, John Henry	Indiana
Mulcahy, Anthony Paul	New York
Mulcahy, Harold Ignatius	Illinois
Mulholland, Clement	Iowa
Mullin, Clair Anthony	Ohio
Mullins, James Thomas	Illinois
Munro, David Duncan	Indiana
Murphy, Edwin William	Illinois
Murphy, Francis Joseph	Indiana
Murphy, George	Minnesota
Murphy, Harold Aubrey	North Dakota
Murphy, James Edward	Iowa
Murphy, James Edward	Connecticut
Murphy, John Leonard	Oregon
Murphy, Louis Ernest	Illinois
Murphy, Louis James	Indiana
Murphy, William Jeremiah	New York
Murtaugh, James Francis	Illinois
Murray, Tiburtius Frank	Connecticut
Musmaker, John Lyle	Iowa

Nadolney, Romanus Frank	Michigan
Nagle, Paul Francis	Iowa
Nalty, Raymond Joseph	Mississippi
Nash, Richard Joseph	Illinois
Naughton, Frank Joseph	Montana
Navin, Louis Edmund	South Dakota

Neary, William Frederick	New York
Neff, Cyril William	Ohio
Neighan, Thomas	Ohio
Neitzel, Francis Herman	Idaho
Nelson, John Christian	Indiana
Nester, Harry Philip	Ohio
New, Fred	Iowa
Niemiec, John Wilfred	Indiana
Nolan, Daniel Patrick	Vermont
Nolan, William	Pennsylvania
Nolon, John Del Val	Colorado
Norbert, B.	Missouri
Norton, John Charles, Jr.	Illinois
Nowak, Edward	Illinois
Nowakowski, Francis Joseph	Illinois
Nyhan, Kenneth Francis	Ohio
Nyikos, Stephen Francis	Indiana
Oberst, Eugene William George	Kentucky
O'Brien, Armand Bennett	Indiana
O'Brien, George	Illinois
O'Brien, Walter Joseph	Ohio
O'Connor, Richard Powers	California
O'Connor, Robert Madden	Indiana
O'Donnell, Daniel Joseph	Pennsylvania
O'Donnell, Earl Clifton	Colorado
O'Donnell, Joseph Maurice	Indiana
O'Donnell, John William	Ohio
O'Donnell, Edward	Ohio
O'Donnell, John Cornelius	Ohio
O'Grady, George Joseph	Illinois
O'Hara, Joseph Patrick	Iowa
O'Hara, Robert Emmett	Indiana
O'Keefe, Walter Michael	Connecticut
Olney, Thomas Albert	Indiana
O'Loughlin, James	Iowa
O'Malley, John Thomas	Pennsylvania
O'Neil, Robert Donlevy	Illinois
O'Neill, Walter Joseph	Montana
O'Reilly, Donald Curran	Minnesota
Ortega, Pompilio	Central America

Oseau, Harold Thomas	Connecticut
O'Shea, Maurice Joseph	Illinois
O'Sullivan, Clifford	Illinois
O'Sullivan, Daniel	Illinois
O'Toole, Charles Richard	Pennsylvania
O'Toole, Eugene John	New Jersey
O'Toole, James Lawrence	Pennsylvania
Ott, Edward John	Ohio
Ott, Francis Dewey	Ohio
Ovington,, Thomas	Ohio
Owens, Thomas Emmet	New York

Paden, Paul Vernon	Illinois
Page, William Allen	New York
Palmer, Cornelius	Illinois
Parker, Arthur Franklin	Illinois
Parker, John Stephen	Illinois
Pater, Bernard Vincent	Ohio
Patterson, Dillon Joseph	Illinois
Patterson, George Allen	Illinois
Paulissen, Karl Adrian	Indiana
Pavlinac, Joseph Henry	Pennsylvania
Pearson, Patrick Dudley	Wisconsin
Pease, Le Roy	North Dakota
Peck, Robert Alfred	Colorado
Pedrotty, Francis	Ohio
Penner, Rolland Arthur	Indiana
Peschel, Joseph Kasper	Illinois
Pfeiffer, Cornelius John	Kentucky
Pfeiffer, Edward Henry	Kentucky
Pfohl, Paul Joseph	Illinois
Phalin, George Emmet	Illinois
Phelan, Robert Richard	Iowa
Pieper, Raymond	Washington, D. C.
Plante, Victor Eli	Indiana
Plouff, Thomas, Jr.	Wisconsin
Podelwitz, Joseph Nicholas	Indiana
Poinsot, Gilberg Alfred	Mexico
Portman, Charles Joseph	Pennsylvania
Powers, Jeffrey Virgil	Ohio
Powers, John Christian	Ohio

Powers, John Murray	Ohio
Powers, Michael Raymond	Wisconsin
Powers, Patrick Gerald	Wisconsin
Powers, William Herman	Pennsylvania
Prokop, George Edward	Ohio
Pulskamp, Bertrand Henry	Indiana
Purcell, William	Missouri

Rafter, Joseph	Pennsylvania
Rahe, John Samuel	Indiana
Railton, John Randolph	Illinois
Randall, Thomas Gerald	Michigan
Raub, Edgar Jacob	Ohio
Rauber, Walter Frank	New York
Rauh, Walter Ignatius	Ohio
Recker, Wayland	Ohio
Reddington, John Joseph	Indiana
Reeves, Eugene Leo	Missouri
Reichert, Ardo Ignatius	Minnesota
Reichert, Romaine Raymond	Minnesota
Reid, Clarence David	Minnesota
Reider, Leo Peter	Indiana
Restrepo, Ramon, Jr.	South America
Rey de Castro, Ezequel	South America
Rey de Castro, Hector	South America
Reynolds, Richard James	Illinois
Rhomberg, Albin Anthony	Iowa
Rhomberg, Joseph Andrew	Iowa
Rice, John Michael	Ohio
Rice, Raymond	Indiana
Rice, Walter	Indiana
Richwine, Harry Allen	Indiana
Rick, Joseph George	Texas
Riegler, William Louis	Pennsylvania
Riley, John Thomas	Florida
Riley, Harold Paul	Iowa
Riley, Wilfred Joseph	Massachusetts
Rivard, Jules Xavier	Illinois
Rivera, Jose Maria	Mexico
Robinson, William	Indiana
Roche, William Francis	Pennsylvania

Rogers, Patrick Moren	Indiana
Roehm, Richard Moran	Indiana
Rogers, Patrick John	Ohio
Rohrbach, John Melvin	Missouri
Rohyans, Emmett	Indiana
Rolwing, Edward Merlin	Illinois
Romana, Ferdinand Lopez	South America
Romero, Pedro, Jr.	New Mexico
Rooney, Eugene	Illinois
Rosenthal, Joseph Dewey	Wisconsin
Rosselot, Enrique	South America
Roth, Nathan	Indiana
Ruane, Joseph Francis	Pennsylvania
Rubio, Rafael	Cuba
Ruble, Charles Barneo	Indiana
Rusche, Henry Joseph	Michigan
Russell, Walter John	Illinois
Ruzek, Oscar	Michigan
Ryan, Alfred Charles	Arizona
Ryan, Edward Joseph	Illinois
Ryan, Edwin Sylvester	Illinois
Ryan, James Hilary	Illinois
Ryan, James Joseph	Rhode Island
Ryan, John Leo	Illinois
Ryan, William Francis	Illinois
Ryan, Francis James	Ohio
Rynn, Francis James	Ohio

Sabinus, B.	Michigan
Salter, Albert Gregory	California
Sanders, Cyril George	Ohio
Sanford, Joseph Francis	Michigan
Saris, John	Wisconsin
Sauer, Leonard William	Indiana
Saulsberry, Henry Aloysius	New Jersey
Scanlon, Michael Joseph	Ohio
Schader, Frank Conrad	Illinois
Schmucker, Walter Joseph	Texas
Schmitt, Aloysius Dennis	Indiana
Schmitt, Edward Joseph	Iowa
Schmitt, George Victor	Pennsylvania

Schnettler, Herbert	Michigan
Schreyer, Charles George	Indiana
Schubert, Carl Edward	Indiana
Schubmehl, Raymond Jacob	New York
Schwarz, Michael Nicholas	Kansas
Schwertley, Paul Joseph	Florida
Scofield, Paul	Ohio
Scothorn, Wilson	Iowa
Scott, Alfonso Aloysius	California
Scott, Joseph Aloysius	Indiana
Scully, Michael Freeman	Texas
Sexton, Daniel Leritz	Illinois
Seyfrit, Michael Franklin	Illinois
Shanahan, Eugene John	Ohio
Sharp, Ivan Cullen	Oregon
Shaughnessy, Joseph Bernard	Kansas
Shaw, James Clement	Iowa
Shaw, Lawrence Timothy	Iowa
Shea, Arthur Cotter	Indiana
Shea, Robert Driscoll	Indiana
Shea, William Edmund	Ohio
Sheedy, Morgan Francis	Pennsylvania
Sheehan, Robert John	North Dakota
Sheen, Thomas Newton	Illinois
Shiltz, Walter Leonard	Indiana
Shroff, Lloyd	California
Shuler, Thomas	New York
Siberz, Lewis Alfred	Wisconsin
Sidenfaden, Oscar Louis	Idaho
Silk, Joseph Henry	Illinois
Simons, Clarence Patrick	Wisconsin
Sisung, Frank James	Michigan
Sjoberg, Ralph Eric	Illinois
Skelley, James Lawrence	Iowa
Slackford, Frederick John	Ohio
Slaggart, Alfred William	Michigan
Slaine, George Herman	Pennsylvania
Smith, Charles	Illinois
Smith, Clarence Ralph	Minnesota
Smith, Delbert Devereaux	Illinois
Smith, Gerald Aloysius	Ohio

Smith, Louis William	New York
Smith, Maurice Francis	Illinois
Smith, Peter Thomas	Texas
Smith, Vernon Ogden	Indiana
Smogor, Eugene Aloysius	Indiana
Sousley, John Bernard	Indiana
Spaulding, Benedict Athanasius	Kentucky
Spears, Leonard Francis	Indiana
Spitler, George Dean	Minnesota
Stanley, Basil	Indiana
Starrett, Edwin Morris	Washington
Steger, Peter	Illinois
Steinly, Sylvester Anthony	Ohio
Stephan, John Bernard	Illinois
Stephan, Lawrence Sylvester	Indiana
Sternberg, Edwin Lawrence	Illinois
Stevens, Charles Andrew	Illinois
Stock, George	Missouri
Stolwyk, Adrian Louis	Iowa
Storen, Mark	Indiana
Stowe, Ralph George	Montana
Strable, Leo Lawrence	Michigan
Strieder, Otto Steven	Indiana
Stuhldreher, Walter Joseph	Ohio
Sugrue, Stephan Joseph	Illinois
Sullivan, Daniel Edward	New York
Sullivan, Edward Stephen	Indiana
Sullivan, George Leo	Montana
Sullivan, John Charlesworth	Minnesota
Sullivan, John Norton	Iowa
Sullivan, Joseph Patrick	Illinois
Sullivan, Merton Leo	Wisconsin
Sullivan, Thomas Joseph	Ohio
Sutter, William Francis	New York
Susen, Benedict Paul	Illinois
Sylvester, B.	Ohio
Swann, Charles Ellsworth	Illinois
Swanson, Carl Uneo	Illinois
Swanson, Plin Joseph	Indiana
Sweeney, Paul Emmett	Iowa
Sweeney, James Johnson	New York

Sweeney, Vincent de Paul	Pennsylvania
Sweeney, Walter Aloysius	Indiana
Swift, Raymond Earl	Iowa
Swift, Richard	Iowa

Tatham, Roy Francis	Mississippi
Taylor, Arthur Gordon	Indiana
Theodore, B.	Louisiana
Thomas, Frank William	Indiana
Thomas, Robert Joseph	Indiana
Thompson, Joseph Hamilton	Tennessee
Thompson, William James	Illinois
Thornton, Maurice John	Indiana
Tierney, Michael Joseph	Canada
Tillman, Joseph Lawrence	Ohio
Ting, Paul	Philippine Islands
Tiongcoo, Felix Zavalla	Philippine Islands
Tobass, Anthony John	Indiana
Tobin, Richard Walsh	Ohio
Tobin, Thomas Joseph	Pennsylvania
Torres, Jesse Nazario	Central America
Tosney, James Healy	Illinois
Toth, Emery Stephen	Ohio
Trafton, George Edward	Illinois
Trant, James Leo	Indiana
Traresk, Florian Edward	Illinois
Troman, Joseph Michael	Michigan
Truder, Thomas Vincent	New Mexico
Truel, Henry Katz	South America
Tschudi, Edmund Carl	Iowa
Tyler, Benjamin Franklin	Missouri

Uebbing, John Edward	New York
Uebbing, Albert Anthony	New York
Uhlmeyer, George Albert	Illinois
Unverferth, Elmer Bernard	Ohio

Valker, Herbert	Minnesota
Valker, Leo Irwin	Minnesota
Vallez, Arthur Henry	Michigan
Van Aarle, Thomas	Ohio

Van Ackeren, Eugene Constant	Indiana
Van Ackeren, Paul Martin	Nebraska
Van den Boom, Eugene Henry	Missouri
Vandewalle, Lawrence Albert	Indiana
Van Dolman, Alvin Theodore	Illinois
Van Lent, Robert John	Iowa
Van Dyke, Lewis	Illinois
Ventress, Frank Ward	Arkansas
Viesca, Gustavo Roberto	Mexico
Vignos, James Clair	Ohio
Villanueva, Manuel Guillermo	South America
Vogel, Wendell Mathias	Indiana
Vohs, Dale	Illinois
Von Merveldt, Egon Carl	Oklahoma
Voss, William Lawrence, Jr.	Illinois
Vurpillat, Francis Jennings	Indiana

Wack, George Joseph	Ohio
Wageman, Patrick Henry	Texas
Wagner, Joseph Albert	Illinois
Wallace, John Frank	Ohio
Wallace, Lawrence Andrew	Iowa
Walsh, Clyde Aloysius	Illinois
Walsh, Earl Francis	Iowa
Walsh, Francis Thomas	Illinois
Walsh, Henry	Connecticut
Walsh, Herbert Mark	Illinois
Walsh, James Gerald	Iowa
Walsh, Marcus James	Iowa
Walsh, Thomas Anthony	Illinois
Walsh, Vincent	Montana
Walter, Gerald	Indiana
Ward, Archie Burdett	Illinois
Ward Clifford Bernard	Indiana
Ward, Leo Bernard	California
Ward, Leo Lewis	Indiana
Ward, Thomas Bernard, Jr.	Indiana
Waters, Thomas Joseph	Massachusetts
Watson, Francis Duffy	Indiana
Weber, Bernard Aloysius	Illinois
Weber, Harold Anthony	Indiana

Wegman, Raymond	New York
Weickgenant, Charles Jacob	Michigan
Weis, Matthew William	Minnesota
Weisend, John Leroy	Ohio
Welch, James William	New York
Wendland, Martin Edward	Michigan
Wenzel, William Leo	Kansas
Whelan, Horald Vincent	Indiana
Whelan, Russell Francis	Ohio
White, John Edward	Iowa
White, William	Illinois
Wiegner, Walter William	Indiana
Wilcox, James Percy	Michigan
Willett, Albert Bertram	Missouri
Williams, Robert Eugene	Indiana
Wills, Donald Roy	Ohio
Wilson, Earl Henry	Wisconsin
Witteried, George	Illinois
Wolf, Rev. H.	Illinois
Worzala, Frank Edward	Wisconsin
Wynne, Chester Allen	Kansas
Wyss, Clarence Ignatius	Indiana
Young, Daniel Houston	Minnesota
Young, James Francis	Illinois
Zickgraf, Henry Paul	New York
Zimmerer, Mark Eugene	Michigan
Zobel, Alfonso Domingo	Philippine Islands
Zobel, Jacobo Enrique	Philippine Islands
Zwack, Clarence Anton	Iowa

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Kansas	9
Kentucky	31
Louisiana	2
Maine	1
Maryland	1
Massachusetts	37
Michigan	55
Minnesota	26
Mississippi	4
Missouri	21
Montana	9
New Jersey	8
Nebraska	11
North Dakota	7
New York	66
Ohio	120
Oregon	10
Oklahoma	10
Pennsylvania	50
Rhode Island	5
Texas	18
Tennessee	2
Vermont	2
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Wisconsin	44
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